Aalto University
School of Business

SERVICES, SECOND HAND AND SUPERSTARS

A Typology of Modern Sustainable Business Models in the Textile Domain

Master's Thesis
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Abstract of master's thesis

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Abstract

This qualitative study identifies seven main archetypes of modern sustainable business models in the textile domain. Each archetype has its own distinct operational model and typical ways of addressing different sustainability attributes.

The empirical data used in this study is comprised of 51 business models. Information on the business models was gathered online, mainly from the web pages of the companies. The typology was created with thematic analysis, using the Triple Layered Business Model Canvas as a base reference to differentiate between separate sustainability functions.

The seven main archetypes are Business-to-Business Raw Material Recyclers, Modern Second Hand, Sell Products, Services, Renting, Textiles as a Service, and Marketplaces. Despite the unique features of each category, the archetypes typically share some common qualities, such as aiming to lengthen the useful life cycles of products and minimizing resource use and emissions in the production and use phases. None of the archetypes can be described circular in and of themselves, but together the categories form a circular ecosystem of business models.

Keywords sustainability, textiles, typology, business models, circular ecoomy

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Tiivistelmä

Tässä tutkielmassa tunnistetaan ja esitellään seitsemän modernin tekstiilialan kestävän kehityksen liiketoimintamallin arkkityyppiä. Kullakin arkkityypillä on omat tyypilliset piirteensä, kuten toimintamallin perusmekaniikka tai tavat osallistua kestävän kehityksen tukemiseen ja edistämiseen. Tutkielma on kvalitatiivinen.

Tutkielmassa käytetty empiirinen aineisto käsittää 51 liiketoimintamallia. Aineisto on kerätty internet-sivustoilta, pääasiassa yritysten omilta verkkosivustoilta. Typologia on luotu temaattisen analyysin keinoin, aineiston arviointiprosessin runkona on ollut Triple Layered Business Model Canvas.

Tutkielmassa esitetyt seitsemän arkkityyppiä ovat Raaka-aineiden kierrättäjät, Markkinapaikan tarjoajat, Modernit kirpputorit, Uusien tuotteiden myyjät, Palvelut, Modernit vaatevuokraamot ja Tekstiilit palveluna. Kunkin arkkityypin erityispiirteiden lisäksi typologian liiketoimintamalleilla on myös tyypillisesti joitakin yhteisiä piirteitä, kuten pyrkimys pidentää tuotteiden elinkaaria, tai vähentää päästöjä ja resurssien käyttöä tuotteiden valmistus- ja käyttövaiheessa. Yksikään typologian arkkityypeistä ei yksinään täytä kiertotalouden tunnuspiirteitä, mutta yhdessä kategoriat muodostavat liiketoimintamallien ekosysteemin, jota voidaan kokonaisuutena luonnehtia kiertotalouden tunnuspiirteet täyttäväksi.

Avainsanat tekstiilit, liiketoimintamallit, typologia, vastuullisuus, kiertotalous

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1. Introduction

1.1.Background

We are in the middle of a climate and environmental emergency. The scale and scope of the human impact on the ecosystems and even geological phenomena has become so great that some scholars even propose to classify the current era of massive human environmental impact as the Anthropocene (Crutzen, 2006; Zalasiewicz, Williams, Haywood, & Ellis, 2011). Several classification systems have been presented to evaluate the impact human activity has had on the ecosystems, such as the concept of Planetary Boundaries, first introduced by Rockström et al. (2009), or the 17 Sustainable Development Goals (SDGs) of the UN, published in 2015 (United Nations, 2016). The message of both evaluation systems is clear; the impact of human activity urgently needs to be contained, and on Thursday 28th November 2019 the EU declared a global climate and environmental emergency (Rankin, 2019).

The textile industry specifically has been accused of contributing to the climate change problem even more than international aviation and maritime shipping combined. The total greenhouse gas emissions of the industry are at 1.2 billion tons per year, plastic microfibers are released into the oceans at half a million tons per year, and hazardous substances that affect the health of both people as well as the environment linked with the production or use of the garments are still continuously used (Ellen MacArthur Foundation, 2017). It is clear that the textile industry needs to change profoundly, but how exactly can that be accomplished?

Circular economy has been proposed as a solution to many of the sustainability problems across industries. The textile domain is no exception, but the fragmentary nature of the industry – the path of a product from raw material production to the end-of-life solution involves numerous operators and facilities that are not interlinked – makes it hard to create any true circularity when all operators only perform one task in the production chain, making

the responsibility for any sustainability choices fragmentary, as well (Murray, Skene, & Haynes, 2017; Nußholz, 2017; Fletcher, 2013).

However, businesses that claim to be operating more sustainably have sprung up in the textile domain in recent years with accelerating speed, so it is clear some solutions are already in existence. These more sustainably operating modern business models in the textile domain have been examined in various studies, mainly concentrating on the consumer perspective, such as the customer segments, customer perceptions, or consumer behavior (Gwozdz, Steensen Nielsen, & Müller, 2017; Armstrong, Niinimäki, Kujala, Karell, & Lang, 2015; Harris, Roby, & Dibb, 2016; Kang, Liu, & Kim, 2013). There are also studies that have created typologies or taxonomies of either sustainable business models in general (Lüdeke-Freund, Carroux, Joyce, Massa, & Breuer, 2018) or circular business models in particular (Henry, Bauwens, Hekkert, & Kirchherr, 2020; Lüdeke-Freund, Gold, & Bocken, 2019). But no study has been made to create a comprehensible overview of the sustainability-oriented modern business models in the textile domain specifically.

Creating a typology of these business models specifically would help making sense of the current state of the domain (Weick, Sutcliffe, & Obstfeld, 2005), and ease future research in the field by offering a structured framework for the discussion. As a substantial part of my working experience has been within the textile industry, I am personally familiar with the problems of the industry, as well as the confusion in the field around the concept of sustainability, and how it can and should be introduced in the processes on a practical level. I was interested to study these already existing sustainability-oriented business models in the field, to find out the big picture of what kinds of solutions to the main problems are already applied in practice, and what lessons could be learned from them in relation to the industry as a whole.

This study is a part of the background studies for the Sustainable textile systems: Co-creating resource-wise business for Finland in global textile networks (Finix) project (Finix, 2019), which examines the possibilities of sustainable business models in the textile industry in Finland. The findings of my thesis will inform the Finix project of the competition in the

field, and may also provide a platform for ideation for the business models that may emerge from the project.

In this study, I use the term ”textile domain” to refer to all business activity in textiles, fashion and apparel, such as clothing, accessories and raw material, including production, logistics, sales, use, maintenance, and end-of-life solutions. The term “textile industry”, by contrast, only refers to the production chain of the textile, fashion and apparel goods, excluding sales, use, and maintenance functions.

1.2.Problem and Research Questions

The purpose of this thesis is to shed light on the current situation of the operators in the domain of textiles. In order to bring clarity to the situation with the sustainability issues in the textile domain, my main research question is “What kinds of sustainability-oriented business models can be found in the textile domain?” To answer this research question, this study creates a typology of the business models in the textile domain by employing a deductive-inductive thematic analysis on empirical data.

As sub-questions for my main research question I will ask “How do these business models address the sustainability problems in the domain?” and “How can these business models contribute to the overall sustainability of the textile domain?” Answering these questions will form an overall picture of the current state of the domain, and the currently achievable sustainability performance in the field.

The results of this study will be twofold. First, this study provides a typology and a framework to evaluate what kinds of sustainability-oriented business models can be found in the textile domain. Second, this study will provide information on what sustainability aspects these business models typically address, and how they contribute to the overall sustainability of the textile domain.

These two results will provide an understanding of the realistic alternative business models to the current, linear production fast fashion, and how exactly these alternatives can help in

addressing the sustainability issues of the textile domain. The aim is to add knowledge on the best practices in the field, which can in turn lead to a better understanding future endeavors can be based on.

This study has four main chapters; introduction, literature review, method and data gathering, and findings and discussion. First, this introduction chapter provides the background information for the study at hand. Second, I present a theoretical framework to define a sustainability-oriented business model in the textile domain, based on the relevant literature in the field. Third, I explicate the methods of gathering and analyzing the empirical data used in this study. Lastly, I present the findings of the empirical data and create a typology of existing, operating business models that meet the criteria of the framework. The findings and discussion chapter also includes discussion on the ecosystem the sustainable business models in the textile domain create when viewed as a whole.

1.3.Limitations

This study concentrates exclusively on the environmental sustainability factors of the business models examined in the empirical data. Any social sustainability factors, while also valuable, are excluded from this study as a means to limit the scope of this thesis.

The data gathering was also focused on modern enterprises in the textile domain. This has meant that during the data gathering phase a modern take on doing business in textiles was expected of the companies, in the form of visuals, marketing, basic business functions, or other customer or stakeholder interfaces. This criteria is discussed in more detail in the findings chapter, where a distinction between modern and traditional business models have been made.

All empirical data gathered for this study is exclusively secondary. The data is gathered mainly from the websites of the companies included in the data, so the quality of the data is entirely dependent on the truthfulness and accuracy of the information the companies freely and willingly report. As conducting factuality checks is not possible within the scope of this thesis, this risk of the quality of the data must be accepted, but acknowledged.

The potential entries for the data were gathered by interviewing experts and activists in the field, as well as by using internet searches. Even though a saturation system was used to ensure the quantity of data should be sufficient to present all possible categories, it is possible that some types of business models were unintentionally omitted. The scope of the thesis does not permit for a sample size large enough to be considered reliably comprehensible in this regard.

It is also worth noticing that the field of the textile domain changes constantly and rapidly, so this thesis will only present the situation of the spring 2020. It is very likely that some of the categorizations may change as the field gains more momentum and new innovations enter the business, or existing ones may turn obsolete or dated. The possible economic recession that may follow the Coronavirus outbreak of 2020 is also very likely to change the landscape for sustainability-oriented businesses in all fields of business, the textile domain included.

As the results of this study are arranged thematically, and as each entry in the data typically presents several different aspects in the sustainability framework, the categorizations of the analysis could be made based on several different criteria. Therefore the results of this study are open for discussion. However, I have strived for a rigorous sense making process in the analysis part, to ensure the results will present the current situation as logically as possible. The aim has been to arrange the typology of the field in a way that would serve both future research as well as commercial operators best.

2. Literature Review

There are three main sections in this literature review. First, I will discuss sustainability in the textile domain in general, to define the broader term for the purposes of this study, and to cover the overarching problems and solutions in the field. Second, I will discuss the term "business model" in general, and how I have chosen to define the phenomenon in my data collection process. Lastly, I will bring these two notions together to discuss in detail the concept of a sustainable business model in the textile domain specifically.

2.1.Sustainability in the Textile Domain

What constitutes as "sustainable" in the textile domain is contested, and there is no single, widely accepted definition for the term in the domain (Ellen MacArthur Foundation, 2017; Niinimäki, 2013; Fletcher, 2013; Bocken, Short, Rana, & Evans, 2014; Boström & Micheletti, 2016). Hence, for the purposes of this study, I have chosen to define "sustainable" by applying a specific framework to my data. This framework is based on the elements discussed in this literature review chapter, and presented in more detail in the Analysis chapter.

The textile industry is a multifaceted body that is comprised of a multitude of operators. Usually this complex does not form a coherent whole that would work in unison, but rather all actors typically only perform one step in the complicated path textiles travel from the raw material production to the end customer. This means that responsibility for the sustainability factors in this field is also typically fragmented, and since the operators only perform one task disconnected from the other operations, chances for synergy are typically lost or wasted (Fletcher, 2013; Ellen MacArthur Foundation, 2017).

This fragmentary nature is a major hindrance to more sustainable choices in the industry. For example, using a more expensive but recyclable, reusable or biodegradable lubricant in one step of the yarn of fabric production may not be a lucrative choice for the operator in question. If the lubricant is only removed at a facility downstream the processing path, the

facility that makes the decision concerning the lubricant typically does not have the means to collect the removed lubricant from this other facility for re-use, or does not benefit from the biodegradability or recyclability of the lubricant. In situations like this, the operator is likely to choose the cheapest, possibly toxic single-use lubricant instead of the more expensive but sustainable ones, as the benefits or impacts of the lubricant choice are reaped or suffered by someone they may not even have any contact with (Fletcher, 2013; Ellen MacArthur Foundation, 2017).

An another major concern in the sustainability of the textile domain is the current speed of fashion, usually fanned by the fast fashion business model where a sketch can be turned into a finished product line in just three weeks (Fletcher, 2013; Ellen MacArthur Foundation, 2017). However, Fletcher argues that it is not exactly the speed of production or consuming that defines fast fashion – as the production and handling of the raw materials as well as shopping or laundering still take the same amount of time as with other types of textile production – but rather "fast fashion" should be seen as referring to economic speed, where the fast pace of throughput of products in the production line fans the increase of profits (Fletcher, 2013).

This demand for speed places pressure on all of the production phases to both push down the quality requirements for the products as well as compromise the integrity of the choices concerning the production, including working conditions and sustainability factors. It has also pushed down the price of new garments, increased the volume of textile consumption, and reduced the times a single garment is worn before being discarded. This has led to a culture where it is regarded as normal that a person should regularly renew the contents of their wardrobe, and for example only wear certain items once for special occasions, hence perpetuating the unsustainable volume of textile consumption by continuously acquiring new items. It is this culture of over-consumption that encourages, expects and celebrates ever-changing wardrobe choices, together with the pressure for economic speed that drive the unsustainable practices in the field (Niinimäki, 2013; Fletcher, 2013; Kang, Liu, & Kim, 2013; Harris, Roby, & Dibb, 2016).

To break the habit of unsustainable practices, the pace of fashion needs to be slowed down, and the wear only once -mentality has to be challenged. To achieve this, both the production practices as well as the marketing of fashion and textiles need to concentrate on producing and promoting items that aim for longevity, both in their visual appeal as well as in physical endurance, maintenance, and comfort. Lengthening the useful life cycles of garments in one way or another should be a major goal for a business in the textile domain in order to be viewed as sustainable (Ellen MacArthur Foundation, 2017; Niinimäki & Karell, 2018).

So how could this business be run in a more sustainable way? One core paradigm of sustainable business is the model of the triple bottom line. In the model the costs and revenues of a business are considered from a wider perspective, taking into account the social and environmental benefits and impacts in addition to the economical bottom line. By addressing all benefits and impacts associated with the operations of a company, instead of focusing on the financial performance alone, this model provides a more holistic view of the business (Gimenez, Sierra, & Rodon, 2012; Hubbard, 2009; Slaper & Hall, 2011).

An another basic paradigm of examining doing business in a sustainable way is to think of the process through the lens of the idea of creating shared value, as presented by Porter & Kramer (2019). In order to create businesses that can be operated sustainably in the shared value paradigm, businesses should look for win-win situations where they can create value beyond just their own short-term financial benefit. To do this, businesses need to start seeing societal issues as an integral part of their operations, and strive to value creation in ways that are beneficial for all stakeholders. Neglecting value creation outside of direct financial profit can also cause costs for a business in the form of depleted raw material sources, reduced economic or physical wellbeing of their customers, or the viability of their suppliers. A shared value viewpoint in business can ensure the longevity of a business while still producing profits for the company (Porter & Kramer, 2019).

Despite its widely acknowledged merit (Hahn, Figge, Pinkse, & Preuss, 2010; Crane, Palazzo, Spence, & Matten, 2014), the shared value paradigm has also been criticized. A

main criticism point has been that the shared value paradigm does not adequately address the tension between social and economic goals, and hence does not present a comprehensible overview of the current situation on the industry level (Hahn, Figge, Pinkse, & Preuss, 2010; Crane, Palazzo, Spence, & Matten, 2014).

This may be true in the present, as short-term economical profits are often at least partially in conflict with ecological or social sustainability issues. However, when examining the domain from the viewpoint of the steps required to achieve a stable, sustainable future operational model for the long term, this tension dissolves. The idea of degrowth portends that in order to build an economical system that can conform to the boundaries of the planet, the notion of wealth and prosperity must be decoupled from the demand of ever-increasing, ecologically unsustainable economic growth. For achieving this, the notions of shared value and the triple bottom line can help in forming the basic operational models of the future businesses (Jackson, 2009; Kallis, Kerschner, & Martinez-Alier, 2012).

Lorek and Fuchs (2013) argue that the pursuit of sustainable development in business necessitates pairing the degrowth ideology with a strong sustainable consumption governance: Only seriously limiting the overall consumption levels, mainly in terms of quantity while quality factors should also be considered, can create a change strong enough for achieving true sustainability. For this reason, incremental or experimental steps towards a more sustainable textile industry are not sufficient to transform the domain towards overall sustainability as a whole. A more profound change is needed, that can encompass the entire system from the mindset of the consumers and business executives to the production and distribution habits of the industry (Lorek & Fuchs, 2013).

The concept of circular economy (CE) offers a general guideline to building an ecologically sustainable ecosystem in the textile domain. As with the term “sustainability”, there is no single, widely accepted definition for circular economy. Nußholz (2017, p. 12) offers a clear definition of a circular business model: “A circular business model is how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material

loops.” Murray, Skene & Haynes (2017) widen the angle on the circular business model to include more explicitly all phases or production, defining the concept as “an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being.”

Korhonen et al. add even more detail, and the perspective of energy consumption: “CE is a sustainable development initiative with the objective of reducing the societal production-consumption systems' linear material and energy throughput flows by applying materials cycles, renewable and cascade-type energy flows to the linear system. CE promotes high value material cycles alongside more traditional recycling and develops systems approaches to the cooperation of producers, consumers and other societal actors in sustainable development work.” (Korhonen, Nuur, Feldmann, & Birkie, 2018)

For the purposes of this study, I will use a synthesized definition of circular economy: Circular economy in the textile domain should entail closing the material loops, lengthening the life cycles of products as much as possible, and minimizing the input of new materials and energy by both concentrating on producing quality over quantity as well as optimizing the use of all resources.

The concepts of triple bottom line, shared value, degrowth, strong sustainable consumption governance and circular economy are not rival theories in the sense that they are not mutually exclusive, but rather represent different lenses through which to examine doing business in a more sustainable way. Each provides a valuable perspective and can be used simultaneously on the same research topic.

2.2.Business Models in General

Despite the fact that the term “Business model” is widely used today, there is no clear consensus on what it means, and the term has been and still is used to describe many different concepts (Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011; DaSilva & Trkman, 2014; Zott, Amit, & Massa, 2011). The term was first used in an academic article

in 1957 (Bellman, Clark, Malcolm, Craft, & Ricciardi, 1957), but wasn't widely used for decades after it was first coined. It began to accumulate mentions in academic literature at a faster pace with the rise of the businesses in information and communication technology or the internet in the 1990's. However, even after the boom in the ICT businesses waned, the term continued to be used in the field of business studies, and seems to have been established as a concept to be used in all kinds of business fields (DaSilva & Trkman, 2014; Zott et al., 2011).

Though there is no consensus of the use of the term "business model", there has been a multitude of attempts to define it. Most of the attempts list attributes of a business model such as "value" and "processes", or different activities a business models may have, but they differ in what, in their view, the core functions of a business model is, or the contours of a business model compared to a business. However, in general, most have the same underlying notion that a business model can be a subject of examination in and of itself, distinct from the company, product, or environment the business model is associated with (Zott et al., 2011; Massa, Tucci, & Afuah, 2017; Chesbrough, 2010; Teece, 2010; George & Bock, 2011; Bocken et al., 2014).

For the purposes of this study, I chose a definition for the term that supports my data collection and analysis processes: A definition that can, for example, make a distinction between a company and the business model. A comprehensible, and one of the most cited definitions for a business model is known as the Osterwalder Business Model Canvas (OBMC) (Osterwalder, Pigneur, & Clark, 2010). Osterwalder defines the term in one, clear sentence: "A business model describes the rationale of how an organization creates, delivers, and captures value." (Osterwalder et al., 2010).

The OBMC uses nine building blocks to discuss the different aspects of a business model; *Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships,* and *Cost Structure*. There is an illustration of the OBMC building blocks in Figure 1. A typical business model addresses each building block in some way, and this structured perspective of nine elements offers a

tool for examining and comparing business models in a reasonable, equitable way (Osterwalder et al., 2010).

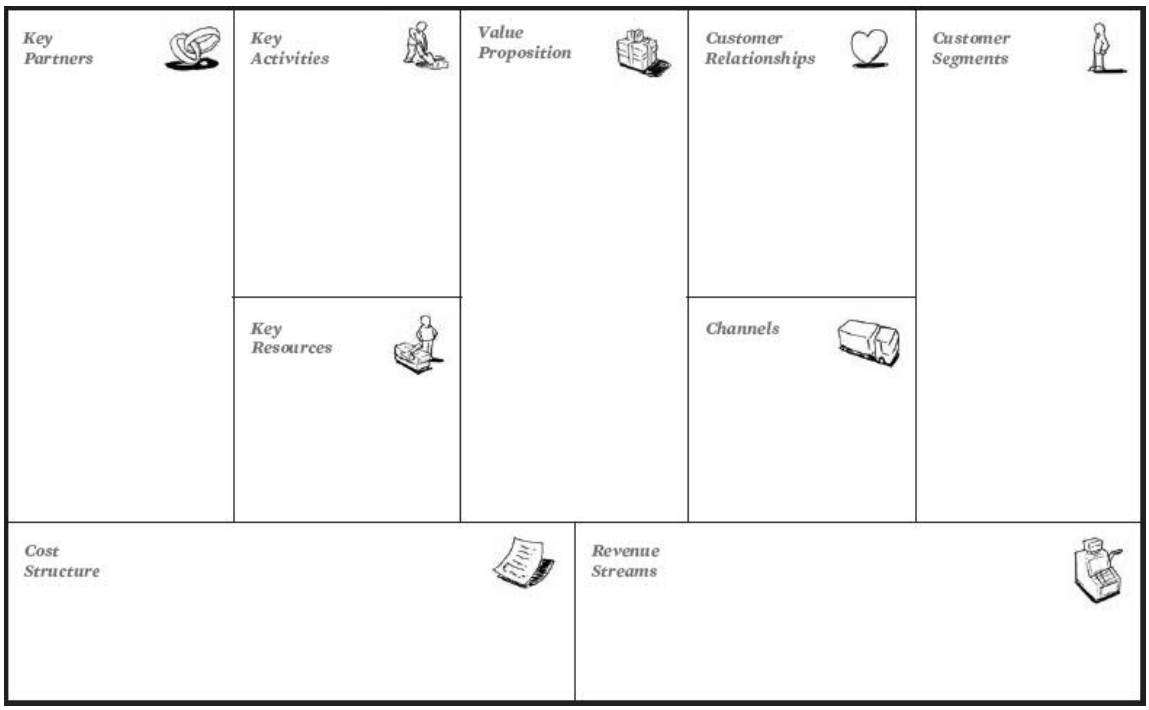

Figure 1. The Osterwalder Business Model Canvas (Osterwalder & Pigneur, 2010)

In this study, I have used the Osterwalder definition to determine what constitutes an independent business model for my data. A function does not need to constitute an entire business in and of its own to qualify for my data, but it does need to have processes of creating, delivering and capturing value independent of the parent company.

I have used four out of the nine building blocks as vital elements in deeming a business model independent of the parent company; Value Propositions, Revenue Streams, Key Activities, and Cost Structure. This means that a sustainability-oriented sub-function or product line of a company can be included in the data even if the parent company would not qualify, as long as the function makes its decisions concerning its products and activities as an independent, separate entity, and at least theoretically could dissociate its

cash flows from the parent company. Customer Segments, Channels, Customer Relationships, Key Resources, and Key Partnerships can typically be shared even between independent rival companies in the textile industry – such as production collaborations, or points of sales – so it would not be reasonable to require these attributes to be independent from a host organization for a business model to be deemed independent.

2.3.Sustainable Business Models in the Textile Domain

As both the terms of "sustainable" as well as "business model" have been contested, it follows that the concept of a "sustainable business model" will be doubly so. For the purposes of this study, I aim to develop a definition that would serve the main goal of this thesis best:

- Inclusive enough to allow for a dataset diverse enough to form a typology
- Exclusive enough to credibly filter out only incremental improvements on the traditional unsustainable operational models or greenwashing
- Detailed enough to allow for an equitable, detailed examination of the dataset

As the business models in the textile domain are very versatile in their operations, this will likely necessitate that such a definition will be multifaceted, to capture and evaluate the different benefits and disadvantages of each operation.

Bocken et al. present eight archetypes of sustainable business models; "Maximize material and energy efficiency; Create value from 'waste'; Substitute with renewables and natural processes; Deliver functionality rather than ownership; Adopt a stewardship role; Encourage sufficiency; Re-purpose the business for society/environment; and Develop scale-up solutions" (Bocken et al., 2014, p. 42). These can be further divided into three main types of business model innovation: Technological, Social, and Organizational (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013). These are intended for classifying any business models in any field, so they could naturally also be applied to the textile domain. But as they do not offer a way to examine the business models equitably in a more

thorough and detailed level, I have chosen not to follow this pre-existing typology, but will look for a framework that provides a more versatile toolbox for my evaluation phase.

There are several definitions for a circular business model (Urbinati, Chiaroni, & Chiesa, 2017; Manninen et al., 2018; Lüdeke-Freund, Gold, & Bocken, 2019; Murray, Skene, & Haynes, 2017; Nußholz, 2017) and even a suggested theoretical framework for a circular business model ecosystem for textiles (Fontell & Heikkilä, 2017). The overarching theme in all definitions is attempting to determine the principles of circular economy and the ways and degree to which they should be implemented in the business model for it to be accepted as "circular". As I synthetized the definition of circular economy used in this study in chapter 2.1. as "Circular economy in the textile domain should entail closing the material loops, lengthening the life cycles of products as much as possible, and minimizing the input of new materials and energy by both concentrating on producing quality over quantity as well as optimizing the use of all resources" a business model would need to address all these issues to be classified as circular in this study.

There are also some tools available for defining and evaluating the circularity of a business model. One is the Circulab toolbox (Circulab Board, 2014) that emulates the OBMC by offering a similar grid to examine the different aspects of a business model from the perspective of circularity. The Ellen MacArthur Foundation also offers their own addition to the OBMC, the Business Model Canvas, focusing on circularity (Ellen MacArthur Foundation, 2016). The Ellen MacArthur Foundation's Business Model Canvas builds directly on the original OBMC, by adding a number of questions and prompts to the nine building blocks to address different sustainability issues within the original economical layer of the canvas. While both are useful for evaluating a business models' performance in circularity, this circular perspective is too narrow to be used for evaluating sustainability in the business models in this thesis. My aim is to examine any kinds of sustainable business models, circular or otherwise, hence the tools for evaluating circular business models do not fulfill the need for inclusivity listed in the requirements for the definition.

Joyce and Paquin (2016) propose a direct supplement to the OBMC consisting of two more layers, similar to the original *economical layer* of the original OBMC; an *environmental*

layer based on the life cycle of the products, and a *social layer* based on the stakeholder perspective. Together with the original economical layer the three layers present the triple bottom line of value a business model creates, and the concept is called the Triple Layered Business Model Canvas (TLBMC).

The environmental and social layers of the TLBMC mirror the original economical layer of the OBMC, each additional building block of the added layers directly linked to the corresponding building blocks in the economical layer. This creates what Joyce and Paquin call vertical coherence; the alignment of every corresponding block in every layer with each other. In addition to all of the three layers needing internal, horizontal coherence, all blocks in all three layers should be aligned to create vertical coherence. This will provide a more holistic perspective on creating, delivering and capturing value, integrating all three elements of the triple bottom line. Clear deficits in vertical coherence may also highlight an area where the business model could improve its performance (Joyce & Paquin, 2016).

The environmental layer of the TLBMC is inclusive enough to cover any and all possible sustainable business models in the textile domain, but exclusive enough to sort out any incremental improvements and greenwashing. As it also succeeds in detailing the different aspects of doing business in a sustainable way in a simple, yet comprehensible way, I have chosen it as the basis of my own framework for this thesis. It differentiates between the elements of business models in sufficient detail to create clear differences between the business model categories in the data, but is not so detailed as to fail to highlight the similarities between the business models that could form a category. I will supplement the TLBMC with viewpoints and details from other literary sources extensively, but the theoretical framework will be built upon the basic structure of the environmental layer of the TLBMC.

As my study is focused exclusively on the environmental sustainability factors of the business models, the economical and social layers of the TLBMC are not examined here with more detail.

2.4.The Environmental Layer of the TLBMC

The environmental layer of the TLBMC supplements the OBMC with nine more building blocks, arranged similarly to the first layer; Functional Value, Distribution, Use Phase, End-Of-Life, Materials, Production, Supplies and Out-Sourcing, Environmental Impacts, and Environmental Benefits (Joyce & Paquin, 2016). These building blocks of the environmental layer of the TLBMC are illustrated in Figure 2. In this sub-chapter I will examine each of the building blocks in more detail, supplementing them with information from other sources as well.

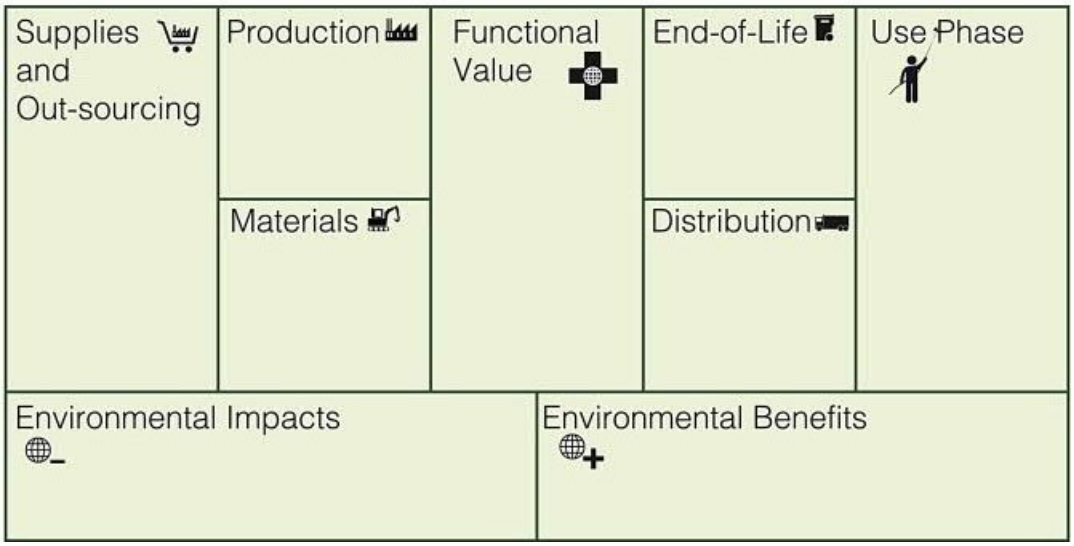

Figure 2. The Environmental Layer of the Triple Layered Business Model Canvas (Joyce & Paquin, 2016)

2.4.1. Functional Value

The functional value building block describes the essential output of the business model. It explains the core benefit a customer gains when doing business with the company; in the textile domain this could be for example a service or a product. The functional value building block is a foundational element in examining the sustainability performance of a

business model, used for clarifying the subject that is being examined, and to form a baseline for the discussion (Joyce & Paquin, 2016).

2.4.2. Distribution

The distribution building block addresses the transportation of goods. This can include transportation in any phase of the production, selling or handling of products, or other customer interface transportation, such as returns. The element entails all facets of transportation, such as distances, weight, transportation method, and packaging. (Joyce & Paquin, 2016) A business model can address environmental issues in distribution by minimizing the transportation needed in the supply chain or minimizing the impact of transportation. A new challenge in the textile business is establishing reverse logistics to ensure post-consumer waste is being collected and utilized in maximum capacity, or to enable sharing economies (Fernie, Sparks, & McKinnon, 2010; Kant Hvass, 2018).

As the textile industry is scattered by nature, every step in production and manufacturing is typically completed by a different facility. For this reason, a product in its manufacturing and retail phases may travel several times between numerous facilities before ending up with the consumer; an average T-shirt may in total travel the equivalent journey of once around the globe during its production. With the rise of sharing economies such as clothing rentals the amount of travel per product is likely to only increase, as especially many of the last-mile journeys may be made multiple times between the consumer and retail or service producer. The environmental impact of transportation of a cotton T-shirt can thus be as high as half the impact of growing the cotton or 16 times its processing impact. Transportation of raw materials is also a significant source of emissions in the textile industry. Emissions from transportation of both finished goods as well as raw materials can, however, be addressed by cutting down the times and lengths a product travels, using biofuel, choosing more sustainable methods of transportation such as trains over airplanes, or addressing efficiency issues in transportation (Fletcher, 2013; Fernie et al., 2010; Ellen MacArthur Foundation, 2017).

Packaging can be a surprisingly significant factor in the overall sustainability of textiles. Reduced packaging, recycled or biodegradable materials in packaging, or choosing reusable or recyclable packaging are ways to reduce the impact of the logistics of textiles. Maximizing the opportunities of consumers to return, recycle or reuse the packaging is an integral part of this development. For rental services, textiles as a service, or other sharing operators that have constant two-way traffic between the operator and customers, using purpose-made reusable clothing bags can be a long-term solution (Ellen MacArthur Foundation, 2017; Fernie et al., 2010).

Reverse logistics – logistics flowing from the consumer to the industry operators – are vital to circular economies, recycling processes and textile renting or textiles as a service operators. This can also include technology to track products and materials to enable product tracking and sorting after the end of the useful life of the garments. As the garments may travel the same routes from retailer or renting operator to consumer and back again multiple times, the efficiency and environmental impact of logistics become ever more important (Ellen MacArthur Foundation, 2017; Fernie et al., 2010; Kant Hvass, 2018).

2.4.3. Use Phase

The use phase building block entails all environmental impacts generated during the use of products, including washing, mending, and maintenance (Joyce & Paquin, 2016). This section also includes the consumption habits of the consumers, as the tools available for business models in the textile domain to address these issues are similar, and often executed in unison.

Depending on the item, up to 40 % of a textile product's environmental impact can be accumulated during the use phase of the product (Kant Hvass, 2018). A business may aim at lowering the environmental impacts of the use phase of their products in several ways, for example by engaging in consumer education to address the longevity of textile products

and to minimize the impacts of laundering (Ellen MacArthur Foundation, 2017; Kant Hvass, 2018).

Laundering can accumulate most of the environmental impact of a garment, even more than growing the raw material, the production of the fabric and finished product, or disposing of the garment at the end of its useful life. Laundering and drying textiles can release microfibers and chemical detergents into waters as well as uses energy and clean water. Just by reducing the times a single garment is washed during its life cycle by half, the overall environmental impact can be cut down by up to 50 % depending on the garment. Following the correct washing procedures for each garment can similarly have a substantial impact on the environmental issues (Fletcher, 2013; Ellen MacArthur Foundation, 2017).

An important factor in the environmental impact of textiles is the longevity of the products. It is estimated that the average times a garment is worn before it is disposed of has fallen by 36 % in 15 years by 2017 (Kant Hvass, 2018). To achieve longer useful lives for textile products, two factors are needed; first, the design of the product and its production needs to enable a useful life for the product as long as possible, and second, the consumer needs to commit to care for the product appropriately and use it for as long as it can serve its purpose. A major concern in the fashion industry therefore is the planned obsolescence and throwaway culture of low quality garments planned to last only a few wears and laundry cycles before being disposed of (Niinimäki & Hassi, 2011).

Lowering the overall consumption rate is an inevitable part of lowering the environmental impact of the textile domain (Lorek & Fuchs, 2013; Kallis et al., 2012). One way to achieve lower consumption could be product-service systems or collaborative consumption, that break the norm of ownership in textiles and shift the focus on services. Product-service systems can consist of products sold with product-related services such as maintenance, repair, take-back or consultancy; products not sold but rented, lent, or swapped; and producing textiles as a service that does not necessarily center on products but rather on producing a result that can be an activity or some other form of output defined by the company (Armstrong, 2013; Jones, Boardman, & McCormick, 2018).

An another way of lowering the overall consumption rate is by engaging in consumer education to inform the public about the problems of the fast fashion and throwaway culture, and to direct the consumers towards more sustainable consumption choices. A prime example of this activity is the clothing brand Patagonia, which regularly engages in advertisement campaigns such as the "Don't buy this jacket" (Patagonia) where they emphasize the importance of only buying what you need instead of treating fashion as entertainment or using constant consumption as a vessel for identity building (Fletcher, 2013).

2.4.4. End-of-Life

The end-of-life building block describes the solutions for the phase where the consumer has ended the use of the product had has decided to dispose of it. This building block can entail recycling, repurposing, incineration and other ways of disposing of an item (Joyce & Paquin, 2016).

It is estimated that up to 80 % of all products become waste within the first six months after their purchase (Kant Hvass, 2018). This throwaway culture wastes not only raw materials, but other resources as well, such as water and energy that have gone into the growing, producing, or logistics of a product. It is estimated that about one third of the raw materials required for the production of the textiles brought to the UK market yearly go to waste in the production phase, never even becoming a part of a finished product. About 1,14 tons of textiles are brought to the market, and 1,13 tons are disposed of yearly. Of the disposed textiles, 540 000 tons are disposed of in re-use, 160 000 tons are recycled, 80 000 tons goes to incineration and 350 000 tons ed up in landfill. It is estimated that up to 73 % of the world's post-consumer textiles end up at landfills or incinerated (Kant Hvass, 2018; Niinimäki & Karell, 2018).

A major challenge with textile waste is the fact that most of the waste is disposed of by consumers, who often have no obligation and little motivation to pay extra attention to the disposal of their textile products at the end of their life cycles. For any collection scheme

directed at consumers to work, three main things that need to be sufficiently addressed; convenience, awareness and trust, and incentives. The abilities and willingness of the consumers to co-operate are key elements for a successful end-of-life solution (Ellen MacArthur Foundation, 2017).

There are currently several fragmentary textile recovery systems in place, such as collection of textiles by charitable organizations or officials, fashion brands' in-store textile waste collection take-back initiatives, or municipal recycling centers (Kant Hvass, 2018). The EU has decreed that all member states should arrange for separate waste collection for textiles starting 1 January 2025 (European Union, 2018). The new directive aims at unifying the textile recovery procedures, to facilitate the industry operations in recycling,

After a textile product is recovered as post-consumer or post-industrial waste, there are six different possibilities for processing it while still retaining its value in some form. The textile can be reused for the same purpose as before, redesigned, repurposed, repaired or reconditioned to draw maximum value out of the product before discarding it, or recycled as raw material. Incineration or landfill should only be used as a last resort solution (Kant Hvass, 2018; Fletcher, 2013).

The waste salvaging and recycling efforts have been criticized for working within the same system that has created all the major problems in the first place, hence only taking advantage of the current, problematic modus operandi instead of actually changing it. Recycling and reusing textiles may merely slow down the cycle, but don't fix the root problems deeper in the system. There are also concerns that recycling and second handing may also be interpreted to absolve consumers from their responsibility with their garments, as they can think they have not participated in the linear fast fashion model, but merely been a link in the chain of an item's life cycle (Fletcher, 2013).

There is a clear need for efficient and convenient textile waste recovery systems, to ease both the consumers' need to get rid of their unwanted textiles as well as to ensure the products will be reused for as long as they can, and when they are at the end of their useful life, to ensure the recovery of the valuable raw materials for the organizations that can reuse them. Even after the main problem of reclaiming the textile waste from consumers or

industrial organizations would be solved, the problem of sorting, reselling or recycling the recovered material remain (Kant Hvass, 2018; Ellen MacArthur Foundation, 2017; Fletcher, 2013).

2.4.5. Materials

The Materials building block entails all raw materials used to produce the goods or services the business model offers. Even if listing all material resources used in the business activities would be impractical, at least the key materials should be addressed (Joyce & Paquin, 2016).

The choice of raw materials used in a textile product will affect the environmental impact of the product for the entirety of its life cycle, from cultivation to manufacturing, consumer use phase, laundering, and finally the recycling or disposal opportunities at the end of the useful life of the product. As all fibers have different challenges in environmental impacts, there is no one fiber that could be deemed as a fundamentally sustainable choice or even simply more sustainable than others for all purposes. All fiber choices include trade-offs; for example, cotton production is one of the heaviest crops in the world in terms of water and pesticide use, accounting for an estimated 16 % of all pesticide use worldwide (Fletcher, 2013), whereas the production of polyester requires non-renewable raw materials and more energy per kg than cotton. To assess the impacts of the raw materials used in textiles, attention needs to be paid to *resource use*, such as energy, water, chemicals and land; *waste and pollution produced*, such as air, water and land pollution; as well as the *social impact* of the raw material production (Fletcher, 2013; Ellen MacArthur Foundation, 2017).

About 97 % of the raw materials used in textile production come from virgin sources; only about 3 % from recycled materials. Only 13 % of the total material used in the textile industry is recycled as post-consumer or post-industrial waste, and less than 1 % of material used to produce clothing gets recycled as new clothing. Increasing the rate of recycling materials, both by using recycled materials as well collecting the used items for

recycling could be an effective way of curbing the environmental impacts of raw materials (Ellen MacArthur Foundation, 2017; Fletcher, 2013).

The factors that have the biggest impact on the environment in raw material production in textiles are water and pesticide consumption of cotton cultivation, water use of other natural fiber production, the use of energy and non-renewable raw materials for synthetic fibers, and air and water emissions from synthetic and cellulosic fiber production (Fletcher, 2013).

The Ellen MacArthur Foundation lists three most important changes to be made to the raw materials in current textile production: Making effective use of resources, moving towards renewables, and phasing out substances of concern and microfiber release (Ellen MacArthur Foundation, 2017). Changing cotton production into organic or low-chemical or low-water cotton or other fibers such as hemp, linen or lyocell could lower the use of pesticides and water in the growing phase. Changing polyester fibers to renewable, biodegradable natural fibers such as organic wool or bamboo would lower oil consumption and solve the problem of disposal of the garments. Using rapidly renewable, carbon-neutral plant-based fibers such as bamboo or lyocell could help the greenhouse gas accumulation problem while also absorbing the same amount of carbon out of the air during their growth phase as they release upon harvesting (Fletcher, 2013).

A major concern with synthetic fibers such as polyester is their release of microplastics into the waterways during washing. As most of the world's water treatment plants are not equipped to filter the microplastics out of waste water, these plastics end up accumulating in the water bodies around the world, causing harm to marine life and subsequently to humans. The choice of synthetic fiber as well as following proper washing instructions can lower the rate of microplastic release, but not eliminate it (De Falco et al., 2018).

2.4.6. Production

The production component describes the key activities that the business model employs to deliver their main offering. In organizations that offer products as their main functional

value, these activities may include all manufacturing operations, and in service industries the production building block can include all activities needed to deliver the service to the customers (Joyce & Paquin, 2016).

In the manufacturing facilities, there are several steps that can be taken to minimize the environmental impact of processing the raw materials of textiles. Fletcher categorizes the processes that involve preventing impacts from arising in the first place as the "best practices", ones that cause the smallest impact. Ways to achieve this include for example minimizing the number of processing steps; choosing "clean" production techniques; minimizing processing consumables; choosing "clean" processing chemicals; reducing energy and water consumption; and reducing waste production and carefully managing waste streams (Fletcher, 2013).

The fragmentary structure of the textile industry means imposing industry-wide changes is challenging, as most actors are interested mainly in practices that benefit them directly, not the industry as a whole. This can lead to many kinds of environmental problems, as most of the production processes are completed by different actors, who do not suffer of the consequences of their production decisions after the products have left their premises. The key force to drive changes towards more sustainable production has previously been legislation, but as most companies have only fulfilled the legal requirements rather unwillingly and at a minimum effort level, this has not been highly effective in driving change. After the companies have started to be more aware about the effects bad policies may have on their brand image, sustainability issues have started to gain more attention in production practices (Fletcher, 2013).

The core elements of more sustainable textile production can be divided into two main categories: monitoring the *inputs*, such as water, energy, raw material and chemicals, and restricting the *outputs*, such as waste water, solid waste, and air emissions (Fletcher, 2013).

In the textile industry several hazardous chemicals are involved in the spinning, weaving, making, coloring and finishing phases of the production. However, there is limited data or transparency about their use in the industry or the effect they have on the environment, labor force or end users of the products. As there is little accountability in the industry for

the chemicals used in different production phases, it is possible traces of these chemicals will still be present in the finished products, posing possible health risks for the users, being released in laundry, or ending up at landfills or other disposal or recycling systems after the garment has been discarded. Decreased use of chemicals is a key factor in sustainable textile production (Ellen MacArthur Foundation, 2017; Fletcher, 2013; Niinimäki, 2013).

The textile industry is estimated to consume 93 billion cubic meters of water yearly (Ellen MacArthur Foundation, 2017). Water, energy and other resource consumption is a major environmental factor in the textile industry, and any resource use in addition to the raw materials should be reduced to a minimum where possible (Ellen MacArthur Foundation, 2017).

Design is an integral part of the production phase of textiles. Aiming for longevity in both visual as well as physical design of any items produced is an essential part of sustainability in the domain. The design should also allow for disassembly and recycling at the end of the useful life of any item, by choosing materials and designs that are easy to recycle or reuse (Blackburn, 2009).

Due to the fragmentary nature of the industry, transparency in the production chain, from raw material to yarn to fabric to finished product is simultaneously increasingly difficult to obtain, but also increasingly important from the sustainability perspective. As many opportunities for synergy are lost due to the broken information chain, transparency can have an impact both by increasing awareness and promoting the operators who are making more sustainable production choice, it also can help by making the chains visible and bringing the opportunities for better practices into light (Fletcher, 2013).

2.4.7. Supplies and Out-Sourcing

The supplies and out-sourcing building block captures the environmental impacts of any activities or materials that are not considered as core functions of the company. Consequently, this component includes, but is not necessarily limited to, activities and

materials out-sourced by the company that is being examined, collaborations, direct purchases and other types of manufacture or services that are performed by an external partner. The functions this building block captures are necessary for the value creation and delivery processes of the examined business model, but not essential; their role is to support and enable the processes, but they may not be an integral part of the end product. Examples of such elements could be water and energy, which are typically provided by local utility companies, and which the company being examined has limited possibilities to influence. These factors can often also be addressed under other building blocks, such as use phase, production, or materials, as they are typically integrally linked to these activities and hence discussing the out-sourced resources together with these elements may be more sensible (Joyce & Paquin, 2016).

2.4.8. Environmental Impacts

The environmental impacts building block entails the environmental costs accumulated by the company's activities. This component can often present mainly environmental impacts derived and accumulated from the performance executed in the other building blocks, but can also have content unique to this component. Typical listings in this building block can include factors such as ecosystem impact, natural resource depletion, water and energy consumption, waste and emissions (Joyce & Paquin, 2016).

2.4.9. Environmental Benefits

The environmental benefits building block presents the environmental value generated by the company's actions. It is similar to the environmental impacts building block by often containing mainly environmental benefits accumulated by the actions already examined in the other building blocks, such as reductions in emissions or resource use. This component can also include factors unique to this element, such as donations to charity or a ban on tax evasion (Joyce & Paquin, 2016).

2.5.Theoretical Framework

This literature review identified two major underlying problems in the textile industry, that have an overarching effect on the entire domain. The fragmentary nature of the industry hinders the operators in the field from gaining synergies in sustainability issues, makes the responsibilities for sustainability issues fragmentary as well, and hinders any efforts for transparency for textile brands or researchers in the field (Fletcher, 2013; Ellen MacArthur Foundation, 2017) The fast pace of fashion pushes down the quality requirements of products and creates incentives for operators in the field to compromise on all sustainability factors in the production chain. The fast pace of fashion also leads to increased consumption volumes in textiles, and decreased use per item, accelerating the problematic practices in the field (Niinimäki, 2013; Fletcher, 2013; Kang, Liu, & Kim, 2013; Harris, Roby, & Dibb, 2016; Ellen MacArthur Foundation, 2017).

To counter these overarching problems this literary review also identified five concepts of doing business in a more sustainable way. The triple bottom line (Slaper & Hall, 2011; Hubbard, 2009; Elkington, 1998; Gimenez, Sierra, & Rodon, 2012) and shared value (Porter & Kramer, 2019) paradigms widen the perspective of examining business activities from only considering short-term financial benefit into assessing all benefits and costs of the business activity, including environmental and social impacts. The ideas of degrowth (Kallis, Kerschner, & Martinez-Alier, 2012) and strong sustainable consumption governance (Lorek & Fuchs, 2013) focus especially on controlling the ever-increasing consumption levels and finding solutions to balancing financial viability with social and environmental issues. The circular economy paradigm (Murray, Skene, & Haynes, 2017; Korhonen, Nuur, Feldmann, & Birkie, 2018; Nußholz, 2017; Urbinati, Chiaroni, & Chiesa, 2017; Manninen et al., 2018; Lüdeke-Freund, Gold, & Bocken, 2019) offers a holistic lens of examining the field as a whole, and offers one guideline to doing business in a sustainable way.

The term “business model” was defined for the purposes of this study by the Osterwalder Business Model Canvas (OBMC) (Osterwalder, Pigneur, & Clark, 2010). A function is

expected to have independent Value Propositions, Revenue Streams, Key Activities, and Cost Structure to qualify as an independent business model in this study.

The theoretical framework to evaluate sustainable business models in the textile domain used in this study is mainly built on the environmental layer of the Triple Layered Business Model Canvas (TLBMC) by Joyce & Paquin (2016). The building blocks of the TLBMC provide the structure for evaluating the sustainability factors of the business models in the empirical data, but have been supplemented with other literature to provide a more detailed understanding of the main problems and solutions in each element. The most prominent sustainability elements in each building block based on this literature review are shown in Figure 3.

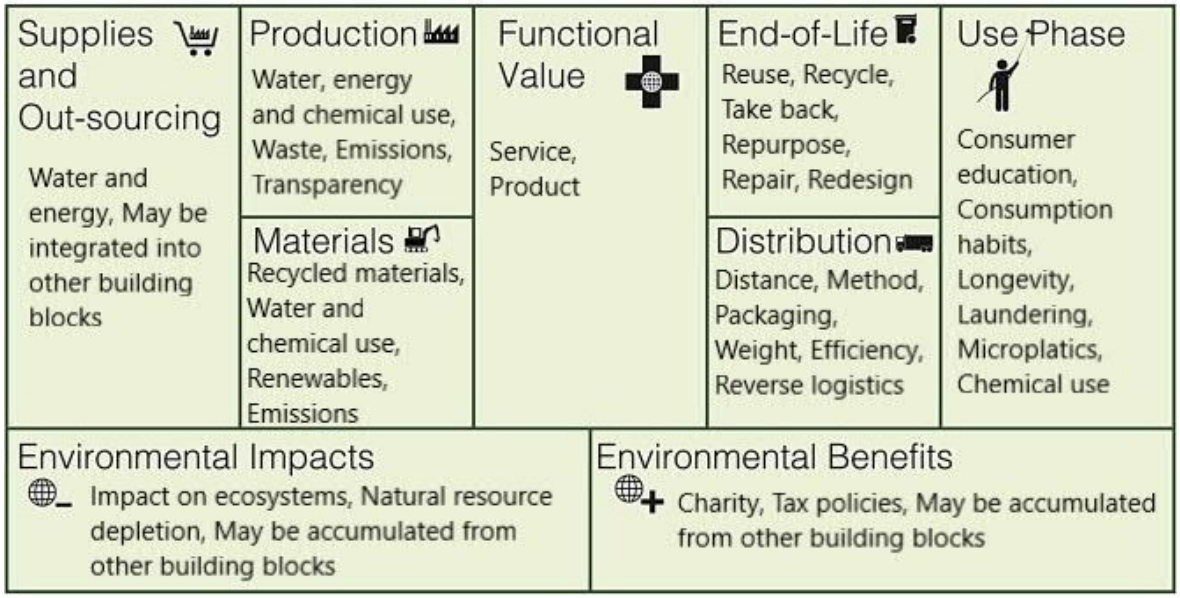

Figure 3. The most prominent elements in each building block of the TLBMC based on this literature review. Modified from the original TLBMC chart by Joyce & Paquin (2016).

3. Research Design and Methods

In this chapter, I explain my methods of gathering the empirical data, and the method chosen for data analysis. Eriksson & Kovalainen argue that the primary criteria to choosing a research method should be what you want to learn from your research. They define qualitative research as centered around interpreting and understanding the phenomena that are the focus of the study you're conducting (Eriksson & Kovalainen, 2015).

As my main research question, "What kinds of sustainability-oriented business models can be found in the textile domain?" is centered on the quality factors of the business models, and as my study is about understanding and interpreting the data I gather, choosing a qualitative method will serve this research setting best.

The qualitative tradition itself includes a wide variety of different methods that can address different kinds of research settings (Eriksson & Kovalainen, 2015). To address my research question, I need a method that can provide a tool to form a classification or typology of my data. For this reason, I have chosen thematic analysis for the method for data analysis. The method is specifically aimed for thematic arrangement and classifying of data (Braun & Clarke, 2012; Nowell, Norris, White, & Moules, 2017; Terry, Hayfield, Clarke, & Braun, 2017; Boyatzis, 1998). As my goal is to create a typology of the business models in my data, thematic analysis will be the main method of data analysis, and the resulting thematically arranged data the main research result of this study.

For data gathering, I have chosen expert interviews to gather the initial list of potential entries for closer examination, then examining the entries online with the data saturation technique (Fusch & Ness, 2015; Guest, Bunce, & Johnson, 2006) to determine when to stop the data collection process, as it is impossible to determine the adequate number of entries in the data before conducting the study.

3.1.Data Collection Process

The context of this research is the sustainability-oriented sub-section of the global textile domain. The data can include any and all forms of business in the domain, such as raw material production, manufacture, retail, maintenance and other related services, and disposal and recycling facilities. The data was collected from a variety of geographical contexts, but exclusively online. The number of entries or the size of the businesses in the data was not pre-limited, but in order to be included in the data a business model needed to be clearly marketing themselves as having extensive investing in sustainable practices in a modern way. In order to be deemed modern, the business models were expected to design their offerings and interactions with their customers in a way that would be attractive and convenient for a consumer who is accustomed to the level of service and comfort of modern day enterprises.

All data used in this study is secondary. The data collection was conducted online, focused on the websites of the businesses themselves, but was supplemented with information found in other sources, such as the Facebook pages of the companies, or published information on the financial performance of the companies when this information was readily available and deemed necessary to provide a holistic picture of the business model in question. The key information in the data is thus entirely dependent on what the businesses themselves proactively report.

The focus on information available online was chosen for two reasons. First, it mirrors the information a regular consumer would have access to, and hence the quality and quantity of information such a consumer would have available to them for making purchase decisions. Second, as it was foreseeable that the number of entries in the data could be dozens or even hundreds, researching the companies in a more rigorous and time-consuming way, such as interviews, would not have been feasible within the scope of one master's thesis.

As the quality and quantity of the data readily available online differs greatly from business to business, the data gathering process also produced uneven results on the companies' sustainability performance, mirroring the reporting quality of the companies in

question. The businesses' information was reviewed online and extracted to a database of the business models in an excel form. The data mainly includes information of the business models based on the building blocks of TLBMC (Joyce & Paquin, 2016) that are vital to the thematic classification of the business models. In addition to the building block themes, some basic information of the business models was also gathered, such as location, number of personnel, financial information and how the business models emerged, where this information has been available.

In order to qualify as "sustainable" for the purposes of this study, a business model was required to fulfill at least one of the following criteria:

- Renting / lending (B2B / B2C / Textiles as a service)
- Licensing / labeling of sustainability-oriented technology
- Raw material from waste
- Material recycling, either post-consumer or post-industrial
- Second hand / recycle products
- Service specifically aimed at lengthening the life cycles of products as the main offering

Alternatively, a business model could also be accepted into the data if it both engaged in substantial consumer education as a main selling point, as well as promoted explicitly the more sustainable material choices, such as organic or rapidly renewable raw materials, or longevity of their products. These criteria have been chosen as they were the most prominent features in the theoretical framework drawn from the literature.

As the main goal of my study is to find and identify more ecologically sustainable ways of doing business within the textile domain, in order to be included in the study, a business model needs to address ecological sustainability issues. Once this criteria has been met, any social sustainability issues the business models may address may have been taken into account as secondary information, but addressing social sustainability issues alone is not enough to classify a business model as "sustainable" in this study. This inclusion was done

purely to create a dataset than can be useful in the future for other research purposes, as the information on social sustainability issues did not affect the typology in any way.

The first step was to collect a list of potential companies for closer examination, by interviewing 5 experts in the field, and supplementing the resulting list from other internet sources, such as the Facebook collective “Eettinen, ekologinen ja vastuullinen muoti”, and lists of exemplary businesses in the field from seminars and course materials. After the initial list was deemed extensive enough with over 200 entries, the first 50, chosen randomly, were researched by visiting their own web pages and gathering information.

After this initial research phase the data gathered was evaluated and the first, tentative round of coding was done based on the codes drawn both from the literature as well as from the data itself. As the Functional Value was the only sustainability building block that was consistently reported on by every entry in the data, this was marked as the tentative divisive factor. Many entries were also disqualified at this stage on the grounds that they do not report on enough sustainability factors to be approved in the data, or that the entry does not represent an independent, clearly definable business model that has regular commercial activity. It was also clear that most of the entries gathered this far were from Finland, though this was not intentional.

The data was then supplemented by internet searches and picking suitable candidates from the initial list of potential companies to be searched, preferring entries from other countries than Finland and striving to find at least a few entries for each Functional Value that had appeared in the data. Abiding to the saturation technique (Fusch & Ness, 2015; (Guest et al., 2006), searching for new entries for each Functional Value was stopped when it could be assumed the data was saturated, either as new entries did not bring in any new information, or when no new entries could be found in the time frame available for this study. New entries in the Functional Value were also actively searched for. This saturation technique has led to some categories having more entries than others in the data, which reflects the proportions of the actual business landscape in the field. The searches were conducted in Finnish, Swedish, English, French and German. Each site was visited once in the data gathering process, during February and March 2020.

The final dataset contains 51 entries. The list of the entries can be seen in Appendix 1. There were seven clearly definable, different Functional Values that could be distinguished in the data, and the number of entries in each category varies between two and 19. Out of the 51 entries, 32 have their headquarters in Finland. This is mainly due to the fact that the study was conducted in Finland, and all of the experts interviewed for the initial list of potential companies for the research were located in Finland at the time of the study, so Finnish companies were the first to spring to mind with many. Other countries represented in the data are China, Czech Republic, France, Great Britain, The Netherlands, Spain, Sweden, and USA.

The unit of analysis in this study is the business model. Consequently a business model could theoretically have been listed as "sustainable" even if the company it is a part of is not, if the business model can be seen as a separate entity, independent – at least on the operational level – from its parent company. However, no such entries were found, so all entries in the data form a business on their own. For example, no product line or undefined sub-parts of businesses on the initial list of potentials were accepted in the data, as none of them was deemed to form an independent business model.

3.2.Data Analysis

3.2.1. Data Analysis Method

The main goal of this study is to produce a typology of the entries in the data, so I have chosen thematic analysis as the main tool for evaluating the data in this study. Thematic analysis is a data analysis method that is specifically aimed for arranging the raw data used in a research into categories or types. It can often be used as the first step in data analysis prior to using other methods of analysis, to create a database that is easier to handle and analyze, but in this study it is the main data analysis tool. Thematic analysis can be conducted *deductively*, implementing a framework drawn from theory on the data, or *inductively*, building the framework from elements that emerge from the data itself (Braun & Clarke, 2012; Nowell, Norris, White, & Moules, 2017; Terry, Hayfield, Clarke, &

Braun, 2017; Boyatzis, 1998). In this study, I will use a mix of both inductive and deductive elements.

Thematic analysis is used for interpreting the raw data at hand, and can even be used to translate the qualitative data into a form that is more understandable for researchers exclusively interested in quantitative methods. Thematic analysis is also known to be highly flexible and can be used for many kinds of paradigms and almost any size of data (Braun & Clarke, 2012; Terry et al., 2017; Nowell et al., 2017; Boyatzis, 1998). As the size or contents of my data are not pre-determined, choosing a flexible and versatile analysis tool is a secure option.

Boyatzis (1998) argues that thematic analysis is not a qualitative method per se, but rather a process that can be used as a supporting and clarifying function while using most qualitative methods, or a bridge from qualitative to quantitative data. However, Clarke & Braun (2012) call thematic analysis a method and Nowell et al. (2017) argue that it is indeed a method in its own right, and can be used as such. For creating a typology, it would be hard to argue that thematic analysis couldn't be regarded as a method that can be used on its own, as it is directed at producing exactly the results I am aiming for in this study.

3.2.2. Analysis of data

The core of thematic analysis is in the use of codes and themes to identify and capture patterns in the data. Once the data is gathered, a framework of codes derived either from theory (in deductive analysis) or from the data itself (in inductive analysis) can be applied to the data to bring out recurring words, terms, or patterns. Then the emerged patterns can be arranged into interlinked themes, to make sense of the raw data and highlight recurring themes or relations between factors that may have seemed unconnected in the raw data (Braun & Clarke, 2012; Terry et al., 2017; Nowell et al., 2017; Boyatzis, 1998).

My study is an inductive-deductive thematic analysis. The framework used to evaluate and categorize the data is drawn from both the literature reviewed in the literature review as

well as directly from the data. This is done due to the fact that many of the entries in my data are relatively novel enterprises and therefore it can be expected that not all aspects addressed by the entries in my data may be covered in literature yet, as theoretical knowledge tends follow the real-life occurrences with some degree of delay. The framework is, however, first built based on the theoretical knowledge and only then supplemented by the inductive themes from the data.

The unit of analysis in my thesis is one business model, and the unit of coding is the key words and terms found in either literature or the data, mainly pertaining to the sustainability attributes the businesses claim to address, structured around the building blocks of the environmental layer in the TLBMC (Joyce & Paquin, 2016).

Boyatzis (1998) lists *three stages* to developing a theory-driven or theory-driven and prior-research-driven code: Sampling and design issues, developing themes and a code, and validating and using the code. Braun & Clarke (2012) list *six phases*: 1. familiarizing yourself with the data, 2. generating initial codes, 3. searching for themes, 4. reviewing potential themes, 5. defining and naming themes, and 6. producing the report.

Boyatzis' first stage seems to precede the first stage of Braun & Clarke, as the sampling and design issues should be cleared before one can familiarize oneself with the data. Boyatzis' stage number two, developing themes and a code cover the phase 2 (generating initial codes) and 3 (searching for themes) of Braun & Clarke's list. The final stage of Boyatzis, validating and using the code, mostly fits together with Braun & Clarke's phases 4 – 6.

The clear and instructive step-by-step guideline to thematic analysis offered by Nowell et al. (2017) lists the same six phases as Braun & Clarke, but in a slightly more practical and detailed manner, so I used their article for guidance for my analysis phase. It is worth noting, however, that the guideline introduced in the article expects the process to be conducted with the data as the starting point, but as my study will be inductive-deductive, my part of my coding will also run in the other direction than described here; from the literature to the data.

1. The data gathering process served simultaneously as phase number one of the Nowell et al. guideline (2017), immersion in the data.
2. Similarly, writing my literature review served a double duty as a starting point for generating the initial codes from the literature to be used for the data. After the data gathering and the first draft of my literature review were completed, I hence also had completed the first two phases of the method.
3. The phase number three, searching for themes, was started already during the data gathering process, by applying the initial code of Functional Value to the data.
4. The phases number three and four, searching for themes and reviewing the potential themes were conducted simultaneously, by arranging the codes into themes and clustering the themes into a typology. The themes were clustered as presented in Boyatzis (1998), by related characteristics and identification of an underlying construct, based on the themes that emerged from the coding process.
5. The phase number five, defining and naming themes. Boyatzis emphasizes the difference between a manifest, directly observable level, and a latent, underlying level of themes (1998). Similarly, Braun & Clarke (2012) list descriptive and interpretative as levels of codes. My typology entails both kinds of levels, as manifest and descriptive presented the starting point for both code generation as well as theme clustering by initially classifying my data into categories based on the quite easily recognizable attribute of Functional Value offered by the companies in the data. However, the more advanced level of my analysis was implemented on the *Sell Products* category, which needed to be divided in to sub-categories due to the size of the main category in relation of the other main categories. Here I used more fine-tuned interpretative codes and latent themes to examine the less obvious attributes of the data, to define four sub-categories that are presented in the Findings chapter with more detail.
6. The final, sixth phase of the process is producing the report. It is worth noting, however, that writing has been an ongoing process throughout the entire analysis, so this formal phase of producing the report only presents the final writing phase where the previously written fragmentary pieces and notes were composed into one

coherent chapter. The result of my analysis is a thematically arranged typology of the data, that presents the key factors in present-day sustainable business models in the textile domain.

The initial codes in the building blocks were defined as follows: The revenue model of a business model typically also represented the *Functional Value* building block of the TLBMC (Joyce & Paquin, 2016). The codes deducted from the theory and used for this block are Services, Products as a service, Sell products (limited to new products sold under the brand name of the company, as opposed to second hand markets or marketplaces that only connect the brands and customers but no not assume any role in the designing or production of the products), Technology Licensing, Renting and lending, Marketplace, Sell second hand, and Collaborations or Knowledge Licensing. The latter was later integrated into the Technology Licensing code and supplemented with the inductive code Raw Material Recycling that tends to aim for the same end result, to create the Business-to-Business Raw Material Recycling.

The *End-of-Life* building block is limited to solutions pertaining to the products produced or sold by the business model. If a business model uses recycled raw materials from some other source than their own production, this is listed under the *Materials* block. The recurring elements here were Take back own products, Recycle as fiber or fabric, or Sell as second hand.

The *Distribution* building block covers the solutions in channels, logistics and other distribution matters, such as packaging. The elements for this building block were Reusable, recycled or reduced packaging, Recyclable packaging as is or as materials, Biodegradable packaging, Efficient or optimized logistics, Or a preference for trains or boats as opposed to air travel.

The *Use Phase* building block includes the sustainability solutions made to lessen the impact of the use phase of the garments, as well as aiming to impact the consumer's choices concerning their textile consumption as a whole. This includes Longevity of the products, Consumer education (aimed for lengthening the useful life of the products by informing the consumers of the correct care of the products, and/or aiming to impact the

consumers to decrease their consumption in general by catering information on the harmful effects of the textile production and urging the consumers to buy less in quantity, but more durable and ethically produced items, and only when they are genuinely needed) Aftercare (such as repairs, or other customer support offered after the item is sold in order to lengthen the useful life of said product), and Less chemicals in cleaning services.

The *Production* building block also includes the solutions for the building block Supplies and Out-Sourcing, since most business models in the data do not make a clear difference between these two in their marketing. Hence the out-sourcing solutions are integrated here, and, if relevant, the Supplies solutions are integrated into the Materials block. The Production block therefore includes No dyeing, Certificates or standards or auditions for the production facility, Hand made, Labor rights observed, Local production, Personal contacts in production, Made-to-order, Transparency, Savings in water, energy or chemicals in dyeing or other processes, Charity donations, and Waste minimization.

The *Materials* building block includes Recycled materials as fiber or as fabric (there has been no difference made based on where the recycled materials have been sourced from – post-consumer, post-industrial, waste salvaging or otherwise – due to the fact that many companies use multiple sources that also may change often, so this difference does not provide a definitive difference between business models), Animal rights, Soil, water and pesticide use reduced or optimized, Organic materials, Rapidly renewable materials, and Certifications and standards for the materials. A general Sustainably sourced virgin materials has been mentioned when most of the main raw materials have been from a recycled origin, and the minority of raw materials have been sourced mindfully, but by several means.

3.3.Limitations of the Analysis and Data Gathering

There are three limitations that concern the quality and coverage of the data gathered. First, as the time frame for conducting this study has been limited, it is possible that the data gathering process has not succeeded to capture all possible business models in the field.

Conducting several expert interviews and rigorous internet searches, as well as using the saturation technique should guard against this possibility, but these do not guarantee an overlook would not happen.

Second, it is worth noticing that within the scope of this thesis I have not had the resources to research the companies at a depth that would enable me to evaluate the information they offer myself. The quality of the data will hence be entirely dependent on the honesty and factuality of the information the businesses freely and proactively report. The trustworthiness of websites has been specifically flagged as a potential risk in electronic research by Eriksson & Kovalainen (2008), but due to time constraints and researchability issues concerning the information gathered for this study, this risk has to be accepted, but acknowledged.

The third limitation in the data gathering process has been the language barrier in some geographical locations. For example, business models in the South Americas and most of Asia were left out because of language barriers, as the websites have only been available in Spanish, Portuguese, or an Asian language that the researcher does not understand. Especially China seems to have a lot of interesting and innovative second hand and textiles as a service businesses, which only have their home pages in Chinese, such as Plum and YCloset. It is possible that some categories would have had more extensive coverage, or even some additional categories would have been created if the information had been available in English.

A limitation to be noted concerning the quality of analysis in this study is low interrater reliability, defined by Boyatzis (1998) as “consistency of judgement among multiple observers”. Boyatzis considers this a typical pitfall in thematic analysis. Even though this thesis has been written as a part of the Finix project, I have conducted all of the research in this study alone. Hence there has not been a chance to evaluate interrater reliability regarding the codes used in this study. If my findings will be used in later research, the future researcher will need to conduct the reliability test themselves.

The definition of “sustainable” in business models will inevitably be open for debate. As my aim has been to research the possibilities in more sustainable business models for

inspiration for future businesses, erring on the more inclusive side is a more sensible option for this study. My definition for a “sustainable business model” should therefore not be thought of as a reliable seal of approval for the businesses in my data. Some of them may only be incrementally better than current fast fashion, and shouldn’t be seen as role models for an entirely sustainable way of doing business in the textile domain. Some businesses may only be listed for addressing only one sustainability factor, but may as such serve as inspiration in how to address that one sustainability issue in the best possible way. Combining all the information from all the businesses in my data may lead to a better understanding of how a future business model ecosystem in the textile domain could address all the aforementioned issues in a more sustainable way as a whole.

4. Findings and Discussion

In this chapter I will present the findings from the data, and discuss their meaning from the perspective of a future ecosystem of the textile domain.

The dataset used in this study is comprised of 51 entries. Each entry depicts one business model, and the main information of each entry is focused on how the businesses claim to address the building blocks of the TLBMC (Joyce & Paquin, 2016). Additionally, some basic background information was gathered when available. This includes country, or the country of the headquarters, if the company operates in more than one location; general notes of the basic functions of the business model; channel of operations, such as a webshop or a physical brick-and-mortar store; founding year; products offered; financial information or other clues of the size of the business; and the background story of how the company has emerged. No single entry in the dataset has comprehensible information on every one of these aspects, but a sufficient analysis of the business models can be conducted even with such incomplete information.

Out of the nine building blocks of the TLBMC's Environmental Layer (Joyce & Paquin, 2016), only six were applied in the data gathering process. This is due to the fact that in the overwhelming majority of the business models examined here, the building blocks Environmental Benefits and Environmental Impacts merely represent direct derivatives from the other building blocks, and hence are redundant when examining the benefits and impacts on a more detailed level.

The building block Supplies and Out-sourcing, on the other hand, has been integrated into the two building blocks Materials (supplies have been integrated here) and Production (out-sourcing has been integrated here). This has been done simply because the business models of the data typically do not make a clear distinction between their own production and out-sourced production in the information they provide, making it impossible to indicate the distinction in the data as well.

As a result, the six building blocks addressed in the data are Functional Value, Distribution, End-of-Life, Use Phase, Production and Materials. As explained in the Data

Gathering chapter, the preliminary classification of the business models in the data was done based on the Functional value the business models offer, partly because this is the only one of the building blocks that has been addressed by every entry in the data. The Functional Value a business model delivers typically has a substantial effect on the overall sustainability performance of the business, so this element is simultaneously the most prominent defining factor of a category as well as one of the most prominent defining factors of its environmental benefits and impacts.

The remaining five building blocks – Distribution, End-of-life, Use Phase, Production and Materials – are discussed on the level of business model archetype to make sense of the overall sustainability performance of each category, and when deemed beneficial for the clarity of the typology, to create further sub-categories.

After Functional Value, the second most often addressed element is Materials, which has been addressed in some way by 31 of the 51 entries. Production has been addressed by 28 of the entries, Use Phase by 27, End-of-Life by 23, and Distribution by 20 of the entries. Out of the 51 entries 32 state Finland as their main location, other countries represented in the data are China, Czech Republic, France, The Netherlands, Spain, Sweden, USA, and UK. The most often cited sustainability attributes in all data are illustrated in Figure 4.

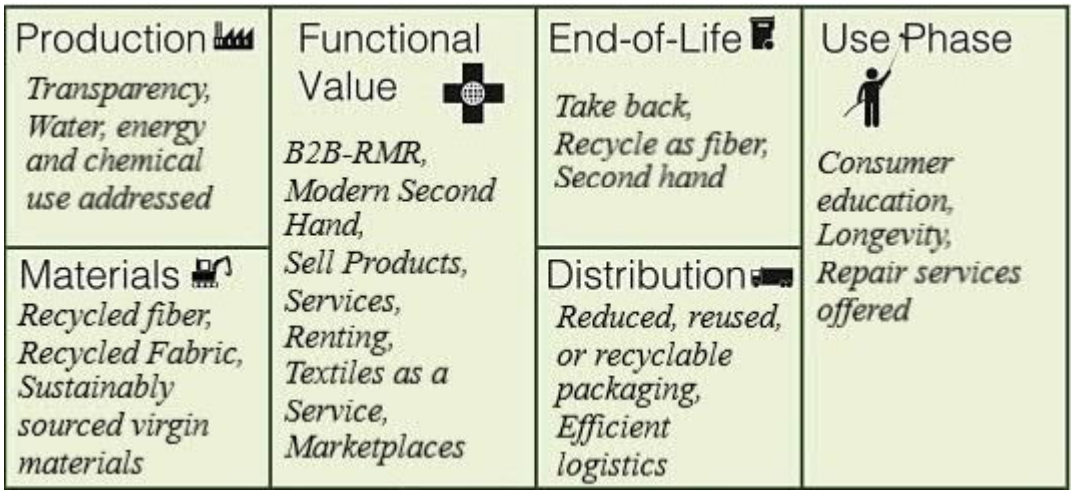

Figure 4. Most cited sustainability attributes in empirical data, arranged by building block. Modified from the original TLBMC chart by Joyce & Paquin (2016).

Based on the Functional Value element, seven main archetypes can be distinguished: Business-to-Business Raw Material Recyclers, Modern Second Hand, Sell Products, Services, Modern Clothing Rentals, Textiles as a Service, and Marketplaces. There are a few "double agents" in the data that could be categorized in more than one category, such as Mud Jeans (rents and sells products) and Arkive Atelier (offers services and sells products). Each of these double agents have been categorized into just one category, based on the functional value they market as their main offering.

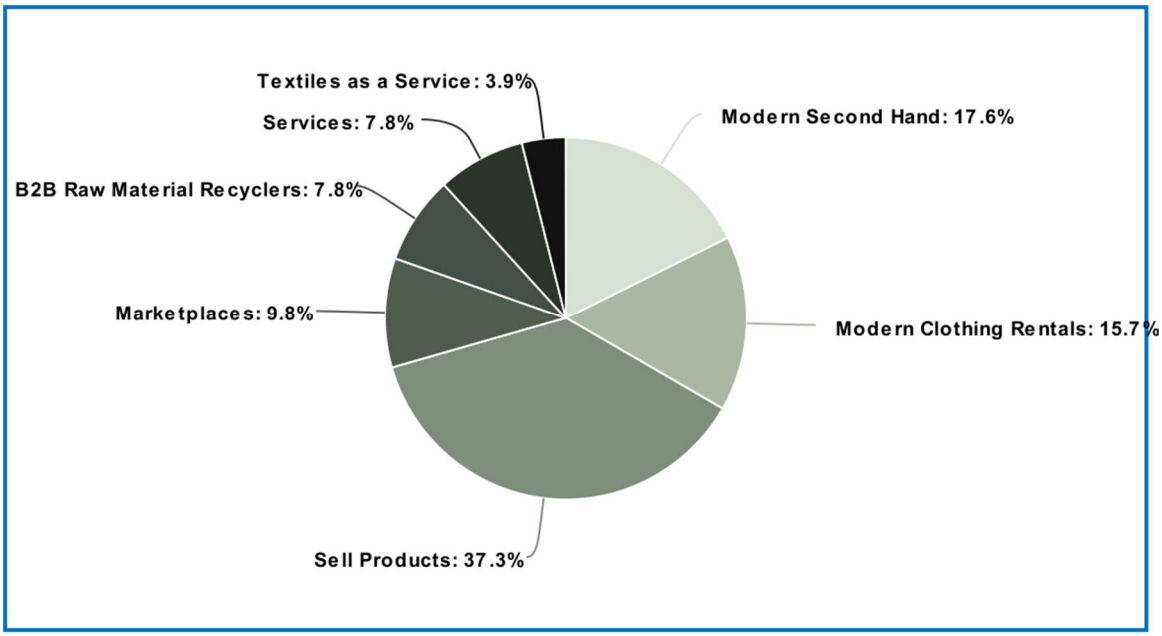

Figure 5. The proportions of the categories divided by Functional Value.

The proportions of the different categories in the data are shown in Figure 5. It is worth noting that the proportions shown may not accurately reflect the proportions of all the sustainability-oriented business models globally. As the data was gathered using saturation technique, some categories could have had remarkably more entries than they currently do, but as the new entries did not contribute new knowledge to the category, the accumulation of that category was stopped in a relatively early phase of data gathering. In contrast, some other categories only accumulated a few entries despite actively searching for more

currently functioning business models that operate with the same Functional Value, hence representing a bigger proportion in the data than they might if the same level of rigorousness in data gathering would have been applied to the categories that were easier to fill. The percentages in the chart therefore only present the proportions of the categories in the data of this study, but as such, do offer a general guideline for what can be expected to be the approximate proportions of the actual businesses globally.

In the following pages I will examine each of the seven archetypes in more detail, and present the most commonly addressed sustainability elements of each category in accompanying Figures 6 – 15. The most common elements of all archetypes are also gathered in a table in Appendix 2.

4.1.Business-to-Business Raw Material Recyclers (B2B-RMR)

A defining factor for the Business-to-Business Raw Material Recyclers is in their way of addressing the Materials element; the business models of the category are concentrated on producing recycled fibers from post-consumer or post-industrial waste, such as used water bottles, used textiles or other textile waste. All business models in this category in the data also work exclusively through business-to-business collaborations with other companies, typically with business models that would fall into the *Sell Products* category of this typology. The collaborations work either by producing raw materials for other businesses which in turn refine the fibers further into textiles, or by licensing technology to be used by the collaborating partners.

As the core function of the business models in this category is to reprocess old products at the end of their useful life, it is also typical that the business models of this category offer the most convincing End-of-Life solutions for their own products of all categories of this typology, by recycling them as fiber once again.

Most entries in this category do not address Use Phase or Distribution issues in any way, except one that mentions using optimized train and boat transportation. They do, however,

typically address Production issues by transparency or checked energy, chemical and water use.

The B2B-RMR was the one category in the data that had the most potential entries that needed to be disqualified based on the fact that a promising entry does not have regular commercial activity, but is rather in a testing or prototyping phase and therefore can't be viewed as a business model as of yet. Such potential entries included initiatives such as TreeToTextile, AaltoCHEM and Spinnova, all of which can be reasonably expected to result in functioning businesses in the future. For this reason, it seems that this category may be one of the most promising for future endeavors, although the entries in the category at the time of conducting this study were still few and small in size.

The business models in this category tend to be young, most less than 8 years old, with the exception of Waste2Wear, which is founded in 1998 and seems to be a much larger enterprise than the other entries, measured by number of personnel (80).

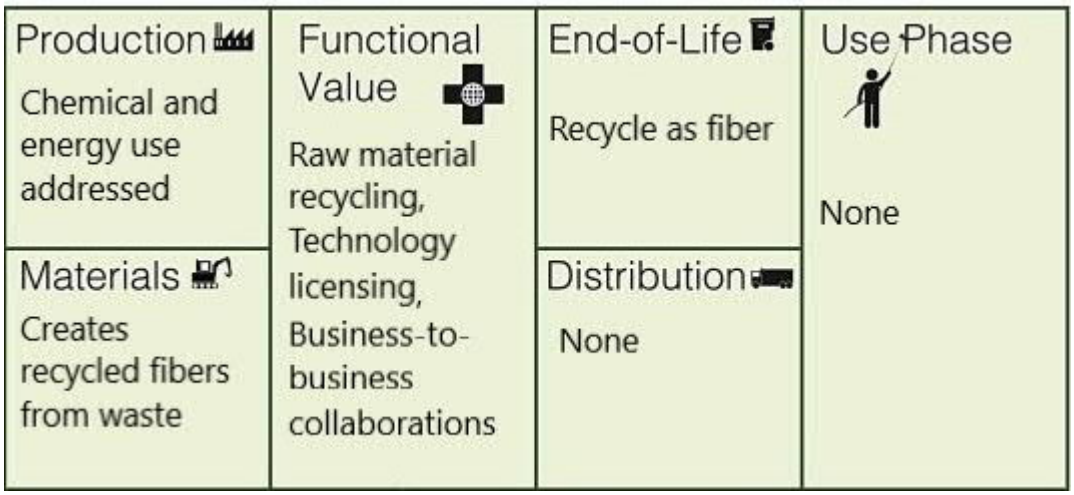

Figure 6. Most commonly addressed sustainability elements in the Business-to-Business Raw Material Recyclers category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.2.Modern Second Hand (MSH)

The field of second hand textiles is broad, but in this study I have exclusively concentrated on the modern second hand businesses. There are three key factors in defining a modern enterprise in this field; an emphasis on the value of the items for sale, services offered for the sellers, and emulating other, trendy fashion retailers in their interaction with buyers.

The emphasis on the value of the items for sale is best observed in the way most of the business models in the data acquire their stock. The more traditional second hand shops typically rely on donated goods, which means the goods they receive and subsequently sell are by definition items verging on becoming waste, that the donor has wanted to get rid of without receiving monetary compensation. The *MSH* businesses typically acquire their stock from sellers with some form of consignment or commission agreement, where the seller obtains at least some fraction of the sales price, hence gaining direct monetary benefit from the sale. This also encourages the sales of more valuable goods, such as brand items or more valuable items such as formal evening wear, which leads to a more high-end offering in the shop.

Services offered for the sellers typically include services rendered for the display of the items for sale, such as photographing and preparing the listing of the items for the webshop or pricing and physically arranging the items for display at the physical store, as well as keeping track of sales in both cases. As most traditional second hand businesses operate on donations, there are no separate “sellers” that would require such attention.

Finally, most of the *MSH* business models in the data strive to emulate other trendy shops that sell new products in their interaction with the buyers. The webshops are designed to create a similar, frictionless buying experience for the buyers as any other, mass-production reliant webshop would. The physical shops aim to produce the same visuals and the same shopping experience as other brick-and-mortar shops in the same area, and may include for example a trendy café for the customers to enjoy while shopping. The aim is clearly to minimize the distinction between buying new or second hand goods in the same product category.

The *MSH* category could be further divided into sub-categories based on two different criteria. Firstly, the business models could be divided into subcategories based on the form of the business; app, webshop, or physical shop. Typically most of the business models only operate on one of these channels, as the products are unique pieces and therefore the businesses can't take the risk that an item might be sold simultaneously via two channels at the same time, resulting in at least one of the sales needing to be canceled.

An another potential dividing factor is the relationship between the seller, the *MSH* business, and the buyer. Some of the businesses operate on a consumer-to-consumer business model, where the seller is an active participant in the selling process and the MSH business model only operates as an enabler for the sale. Some operate as a shop, executing the sales on behalf of the seller. Since there are only nine entries in the data that fall into this category, I have decided not to divide the category in smaller sub-categories, as the resulting sub-categories would be unnecessarily small. However, using either one or both of the suggested criteria for sub-categories could be considered in future research, if deemed helpful.

A particular feature of the *MSH* category is that the business models in this category typically do not tend to declare to address any of the five sustainability attributes besides Functional Value. This is probably due to the fact that the business models of this category can't control the Material, Production, Distribution, Use Phase, or End-of-Life solutions of the products they sell in the same way the other archetypes can. The essence of second hand business is to offer an another life cycle for the products sold, in order to lengthen the useful life of the products, so it is also elemental for the category to not be able to address the other attributes in any way. The main contribution to sustainability in this category is therefore integral for the Functional Value: lengthening the useful life of products that have already been produced.

It is worth noticing, however, that the second hand businesses could extend their contributions to sustainability by considering offering sustainable end-of-life solutions for products that are not sold, or imposing limitations for production conditions or materials of the items they accept for sale, such as fur, in order to discourage the use of such products

and hence discouraging the production of them from virgin materials. Logistics could also be addressed, as they typically entail as much of harmful materials, emissions or wasted resources as with the sales of new products.

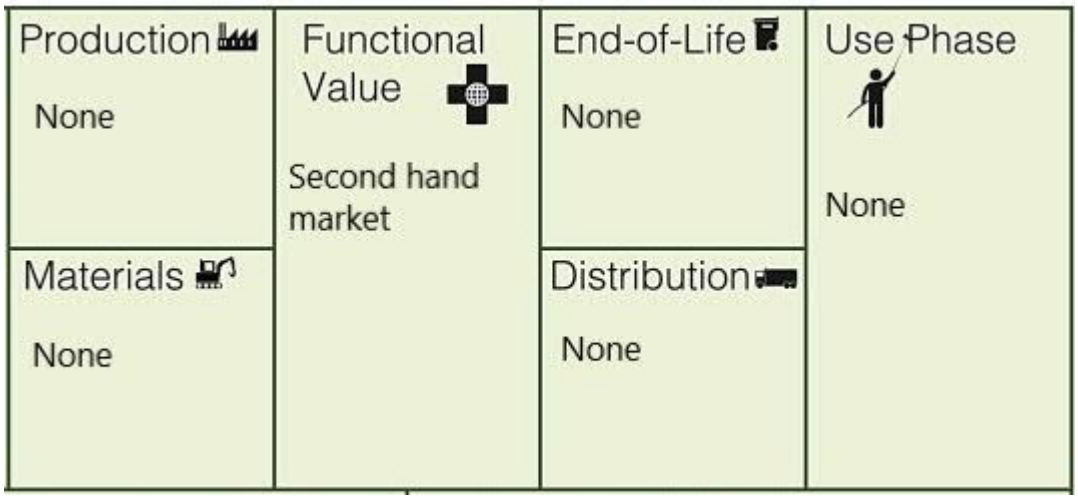

Figure 7. Most commonly addressed sustainability elements in the Modern Second Hand category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.3.Sell Products

Sell Products is the largest of the categories in the data by a wide margin, presenting alone more than a third of the entries in the data, 19 entries out of the total of 51 entries. This is also the category where the saturation technique was most employed, as the data became saturated with the least amount of effort; this may suggest that the actual proportion of this one compared to the other categories in the sustainability-oriented business models globally is most likely remarkably larger than the proportion presented in this study.

All business models in this category typically tend to address the Materials and Production building blocks in at least some way, and most of the entries address these attributes in several ways. Least addressed elements are End-of-Life and Distribution, only about half of the entries have addressed these building blocks in any way.

As this category is the largest, I have divided it into four sub-categories based on the most prominent key element of each sub-category. Two sub-categories are defined by their prominent choices in Materials, one concentrating on producing textiles from recycled fibers, and the other concentrating on producing textiles from recycled fabrics, leather, or other material as it is.

The remaining business models of the category could be defined based on several different factors. In order to create a typology that would adhere as closely as possible to sense making principles, I sub-categorized the remaining entries in the *Sell Products* category based on the main selling point emphasized in their marketing. This resulted in two more categories; *Slow Fashion* and *Sustainability Superstars*.

I will give a more detailed description of each subcategory in the following pages.

4.3.1. Recycled Fibers

The business models in the *Recycled Fibers* sub-category are defined by their choice of material source; they mainly or exclusively produce their textile products from recycled fibers, either from post-consumer or post-industrial waste, and typically in collaboration with a *B2B-RMR* business model. In addition to the Materials element, they also typically address the Production building block especially by investing in transparency. They also typically emphasize consumer education in their Use Phase solutions.

The business models of this category typically do not address the End-of-Life element in any way. This is particularly interesting as the businesses in this category would inherently be in a position to at least direct the flow of products at the end of their useful life towards the *B2B-RMR* companies that they already are collaborating with, in order to bring the products back into the cycle as fibers. Yet only one of the business models in this category in the data – The Other Danish Guy – offers this solution. The business models of this category also typically do not address the Distribution element in any way, and only one company in the sub-category has versatile solutions in this building block.

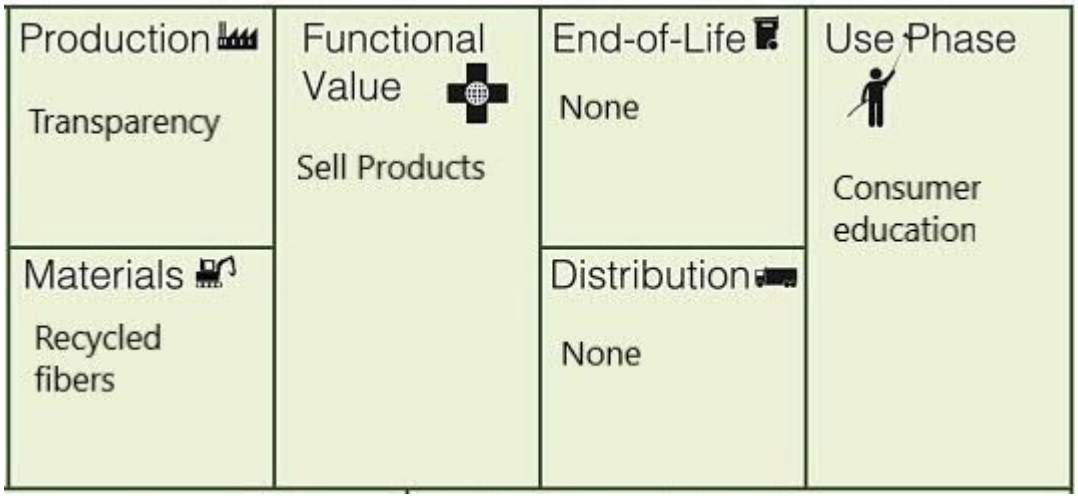

Figure 8. Most commonly addressed sustainability elements in the Recycled Fibers sub-category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.3.2. Recycled Fabrics

The business models in the *Recycled Fabrics* sub-category are defined by their choice of using recycled raw materials as they are, without breaking them down to the level of fiber. The raw materials are typically cutting scraps of other industries, or recycled post-consumer materials, and in some entries may also include leather and other materials in addition to fabrics. A common factor with the material choices is that the raw materials would become waste if the companies of this category would not find ways of turning them into valuable products, making the business models of this category upcycling facilities by definition. The companies typically also list using sustainably sourced virgin materials as a side current of their materials, where recycled materials are not available, such as brand labels and other small parts of their products.

None of the business models in this category address the End-of-Life building block regarding their own products in any way. As the products are made of mainly recycled materials, the companies could be expected to have the skills, vision and knowledge required to offer some solutions for the end of the useful life of their products, either as raw material for other, new products or as raw material for recycled fibers, but no such information could be found.

Only few of the entries of this sub-category addressed the Use Phase or Distribution building blocks in any way. Most have emphasized transparency, local production and handmade small batches in their Production element. A possible explanation for the scarcity of information on many of the building blocks is that most of the companies in this sub-category tend to be small, employing less than 10 people. Many also emphasize in their marketing the personal relationships between the company and the employees, often the founders and owners of the companies being the only working force of the company. This small scale and personal touch in production is a typical defining factor of the whole sub-category.

The essence of these business models seems to be functioning as a clean up service for the textile domain, often making use of the scraps and waste of other businesses and hence reducing the total overall waste of the domain. As such, it seems these business models will stay relatively small in the future as well, as the waste material streams are typically also small, of uneven quality and unpredictable in quantity, making producing large quantities impossible for these business models.

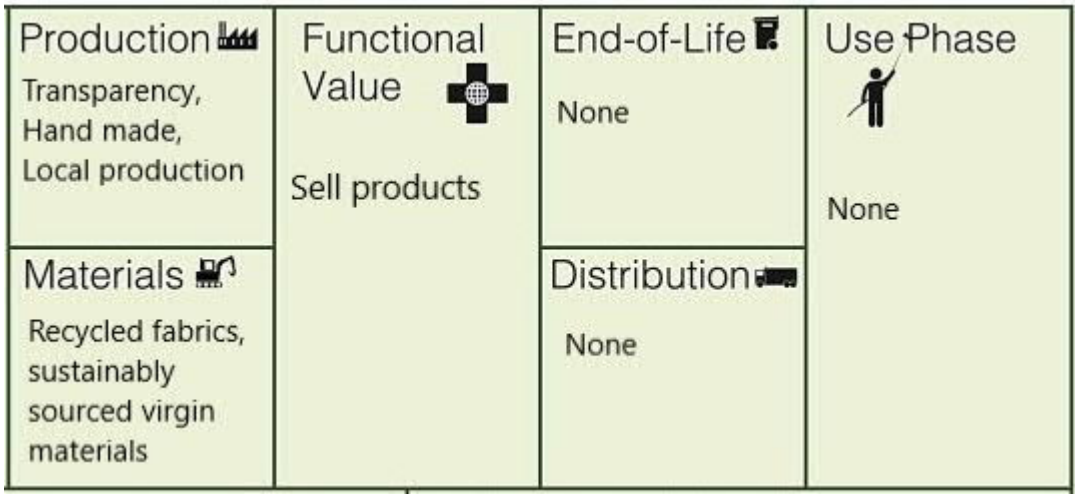

Figure 9. Most commonly addressed sustainability elements in the Recycled Fabrics sub-category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.3.3. Slow Fashion

The key defining element of this category is the Use Phase, specifically the emphasis on the visual and physical longevity of the products offered, and consumer education on mindful living and consuming as the main selling points of the products. The main focus is on slowing down the pace of fashion, ensuring the products sold will stay in regular use as long as possible. For this reason, I have included the brand Oikiat in this sub-category, as their products, the clothing bandages, aim to lengthen the life cycles of clothes.

The business models in this sub-category typically address the Materials element by concentrating on locally and/or sustainably sourced virgin materials, and tend to have an emphasis on animal welfare when animal products are offered.

The *Slow Fashion* business models tend to address most building blocks in some way, but the marketing of their products typically focuses on the quality factors of the garments. The sustainability factors tend to be strongly presented through the shared value lens; the sustainability choices made in the production, logistics and other phases of the life cycle of the products are typically presented as bringing value for the customer by resulting in a superior product, and not as valuable choices in and of themselves. There is little coherence within the category in the sustainability activities reported on, and the reporting on the sustainability attributes also tends to be less detailed than in the *Superstar* sub-category.

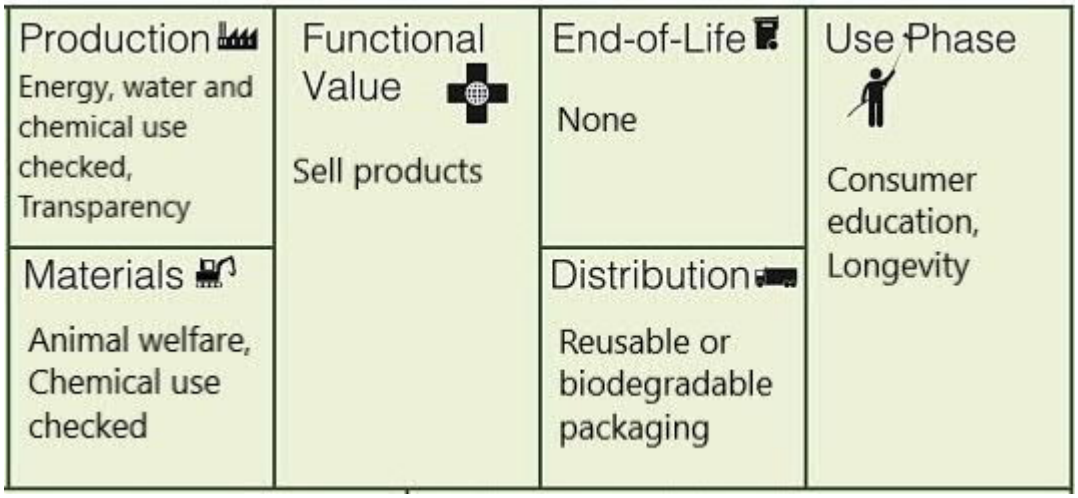

Figure 10. Most commonly addressed sustainability elements in the Slow Fashion sub-category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.3.4. Sustainability Superstars

The final sub-category of the *Sell Products* category is the *Sustainability Superstars*. I call this category *Superstars* because the key defining feature of the business models in this sub-category is the fact that they tend to meticulously address all or most of the five key building blocks: Materials, End-of-Life, Logistics, Production, and Use Phase. Typically, the companies in this sub-category tend to address all of these attributes in several ways, and report an ongoing investing program in improving their performance in sustainability issues even further. Sustainability issues are marketed as valuable and important factors of the operations of these companies in and of themselves, not merely as vehicles for producing a superior product.

The most cited solutions in the Materials building block of the *Superstars* tend to be a mix of recycled fibers, sustainably sourced virgin materials, rapidly renewing raw materials and certified organic raw materials. The most notable feature in the Materials element is that the strategies for acquiring sustainable raw materials typically tend to be highly varied even within one business model, mirroring the intensive attention the companies tend to pay to sustainability matters in all their operations.

Most entries in this sub-category address the End-of-Life building block for their own products, most often by offering to take back the products at the end of their useful life, and typically recycling them as fibers. This is the only category in the entire typology that systematically states such intensive and convincing investing in this component. Most *Superstars* also address the Distribution building block, but typically only by addressing packaging materials. A typical *Superstar* addresses the Use Phase by the same longevity and consumer education factors as *Slow Fashion* business models, but as a distinctive feature several also promote repair services for their products as aftercare.

The Production building block is typically addressed in this sub-category with the same level of varied strategies and intensive attention to even small details as the Materials building block. All of the entries have addressed this element in some way, and most of them report on several different ways of addressing this building block, such as restricted use of chemicals, energy or water, transparency, or local production where possible.

A typical feature of the *Superstars* is also the fact that this is the only category of the typology where the discarded building block of Environmental Benefits would have been useful. Many entries in this sub-category report on environmental benefits that do not directly derive from the other building blocks, such as donations to charity, carbon offsetting, or transparency on financial matters, including a clearly stated ban on tax evasion in all of the subsidiaries of the corporation.

It is also worth noticing that most big-scale companies of the *Sell Products* category in the data fall into this sub-category. It is impossible to determine within the scope of this thesis whether there is causality between the size or success of a sustainability-oriented company and the number of sustainability elements it does, can, or is willing to address, but it is safe to say that a correlation seems to exist between these factors. This could be especially interesting in relation to the criticism towards the shared value paradigm, as this would suggest that creating shared value indeed does create the most sustainable economic value as well.

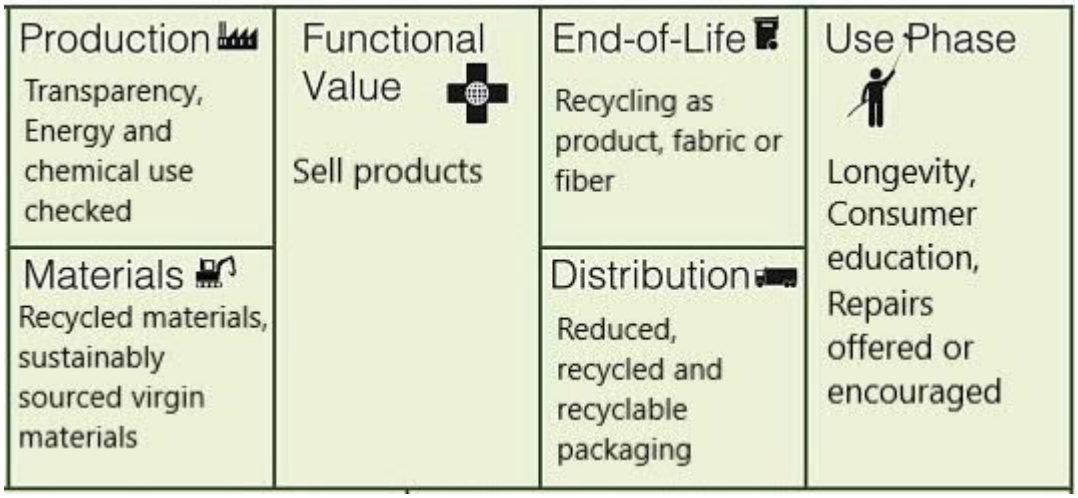

Figure 11. Most commonly addressed sustainability elements in the Sustainability Superstars sub-category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.4.Services

The *Services* category is best defined by the main goal the businesses aim for; lengthening the useful life of textiles and other apparel that are already in existence by maintenance, repairs and alterations, in order to avoid the items becoming waste. A typical feature is also the fact that most of the companies of this category offer a wider selection of Functional Value than just one; some of the business models in this category also provide sewing services for creating new made-to-measure items, sell care products or rent clothing. Theoretically, this could lead to them being placed in other categories than this one, but as the main focus of the companies is on renewing old items, they have been categorized based on this main activity.

The business models in this category typically do not systematically address any of the other sustainability elements but the Functional Value, hence making the lengthening of the useful life of garments already in existence their main contribution to the sustainability of the textile domain. Two of the companies mention longevity in their Use Phase solutions, which is in line with their main contribution to sustainability. Only one of the companies claimed to address the Production building block by mentioning the fact that

their work is hand made. This may be explained by the fact that the “production” phase of these companies is typically executed by hand and by a worker that has at least some direct contact with the customers. Because of this small scale and personal contact they may not mention this separately, as the local, personal work is ingrained into their operations. The companies could, however, mention the use of energy, water and chemicals in their maintenance and cleaning services, but have not done so.

None of the businesses claimed to address the Distribution building block in any way. This can be partly explained by the logistics mainly being conducted by the customers bringing and fetching their products in need of repairs themselves, so the companies have limited possibilities to address this factor. It is worth noticing, however, that some of the business models clearly tend to emulate other, more traditional webshops in the same way as the *MSH* business models, by advertising their services in their webshop in the same manner as the traditional webshops may advertise their products, emulating the frictionless buying experience they offer. In these cases, the logistics services are conducted by the companies of this category and could therefore be addressed by at least stating the ecological impact they have, but this has not been done.

Only one of the business models addressed the Materials building block. As the business models in this category typically do not choose the items they work with, it is understandable they do not report on this element as they have limited opportunities to impact these choices. It is worth noticing, however, that even the repairs, maintenance and cleaning services are conducted with some material use, and therefore these materials such as leather cream or yarns could be reported in either this one or in the Production building block.

The End-of-Life element is inherently not applicable in this category, as the main offering is a service and not a product, and hence does not require an end-of-life solution. As a result, only the one of the businesses that also offers clothing rentals mentions addressing the End-of-Life building block by recycling the garments as fabric or other material. Hewever, it should be noted that the main offering of the category is aimed at delaying the end-of-life of the products they handle, as many of them would presumably be at the end

of their useful life without the repair services. The business models selling cleaning or maintenance products could of course address this element more explicitly regarding those products, but this has not been done.

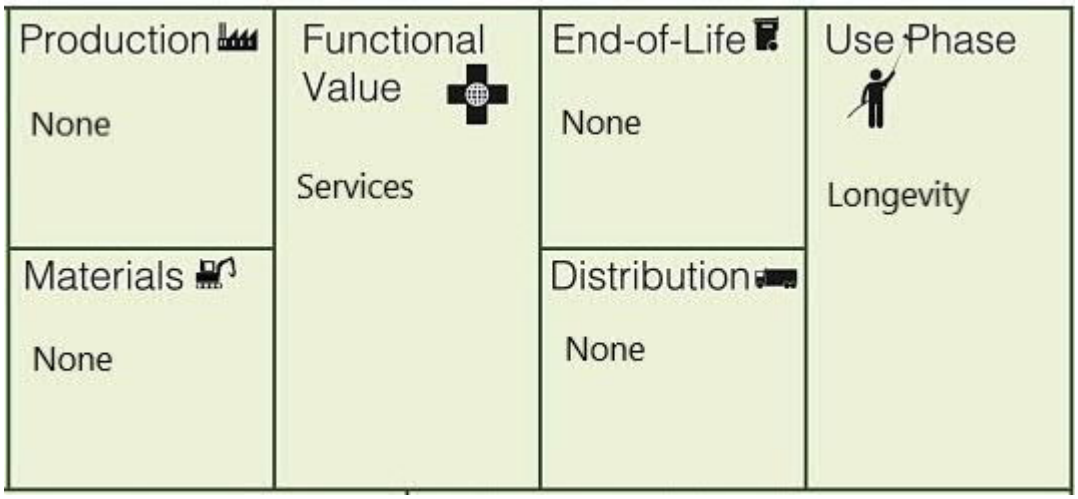

Figure 12. Most commonly addressed sustainability elements in the Services category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.5.Modern Clothing Rentals (MCR)

Traditional clothing rental services have been a part of the textile domain for decades, mainly by way of renting wedding dresses or other special occasion wear. A modern rental service is, by contrast, typically centered around everyday apparel or clothing to wear for work based on a dress code more informal than an official uniform. All of the entries in this category do also offer evening gowns and other items for more formal special occasions, but their main offering is aimed to be worn on a day-to-day basis.

The main defining factor in *MCR* business models is that their main contribution to sustainability in the textile domain is to increase the use rate of the garments by increasing the number of users per garment by way of sharing economy. The offerings range from one-time rentals to a monthly subscription based on a “virtual wardrobe” gathered by the

customer, where new items are automatically sent to the customer monthly, and returns are expected in the same cycle.

Most entries in this category do not address the Material or Production building blocks in any way. The only exception to this is Mud Jeans, which is one of the "double agents" in the data, as they also offer the Functional Value of *Sell Products*; their marketing does not make it clear whether renting or selling jeans is their main focus, so they have been placed in the rentals category as they market it slightly more aggressively. As the only entry in this category to report on these issues is also a "double agent", it seems that this reporting on the Production and Materials elements may stem more from the sell products activity than the renting activity. One entry also reports not carrying leather goods in their selection, as a statement supporting animal rights. Only Mud Jeans also mentions any solutions in the End-of-Life building block other than second hand or donating the items after they can no longer serve as part of the lending library, by recycling the discarded items as fiber.

However, it is worth noticing that many of the *MCR*s do marketing based on their wide selection of known sustainable clothing brands. Lack of reporting on the building blocks that can only be impacted by the producer of the garments, such as Materials or Production, may hence not be a direct indication of negligent attitude towards the issues, but rather just a lapse in the reporting. As all of the entries in this category offer a wide selection of different brands, reporting on the sustainability issues addressed by each brand or garment in the selection would require quite extensive work to be done, which may explain the low level of information available on their websites.

Many of the business models in this category offer cleaning and maintenance services as an integral part of the service. Some even insist that the customers are not allowed to wash or clean the items themselves, but should send the garments back to the company after the rental period is over as they are, even with stains or rips, and the company takes care of all the solutions related to the Use Phase building block. Most of the companies of this category do address the Use Phase element in some way, typically by decreased washing in

general, decreased and checked use of chemicals in cleaning processes, or attempting to lengthen the useful life of the garments by repairs and expert maintenance.

Even though the *MCR* business models' basic operation model inevitably means more transportation per garment during its life cycle with every additional user, only half of the entries in this category address the Distribution building block in any way. The ones that do, however, only report on using reusable packaging, but do not mention addressing the transportation methods in any way. Some of the companies operate based on physical shop or shops, where customers visit personally to pick up and return items, so in these cases the choice of transportation method naturally does not lay with the company. However, many of the business models in this category operate through a website by sending the customers the items they have chosen through some delivery service, and could therefore be expected to address the issue in some way.

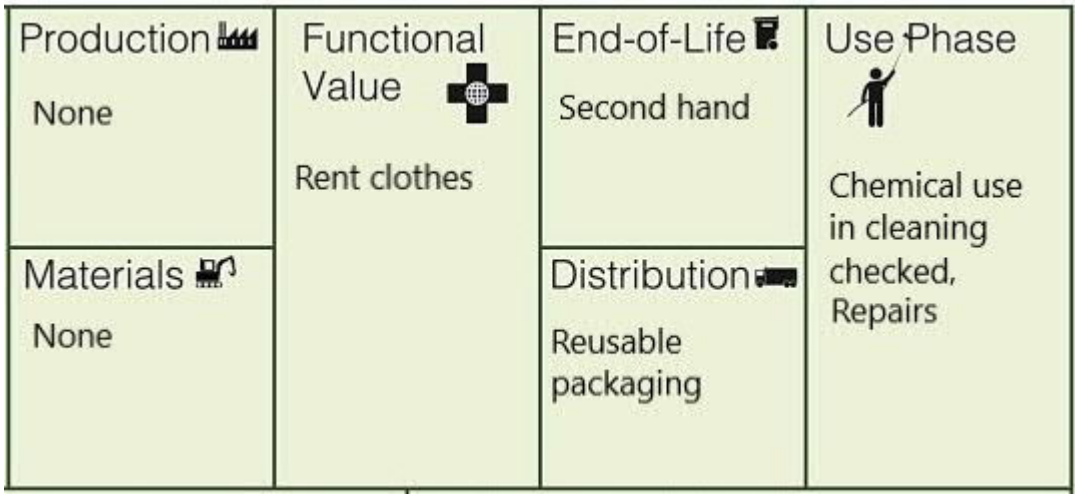

Figure 13. Most commonly addressed sustainability elements in the Modern Clothing Rentals category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.6.Textiles as a Service (TaaS)

Textiles as a service is the smallest category of this typology with only two entries despite actively searching for more during the data gathering process. As the main function of a

TaaS business model is to offer the use of clothing or textiles for the customers for a limited time frame without changing the ownership of the item, its definition is also closely similar to the *MCR* category. However, as the *TaaS* category does have some special defining factors, and as it seems this may be one of the categories most likely to grow exponentially in the near future like the *B2B-RMR* category, I decided to keep it apart as a category of its own.

There are three main differences between the *TaaS* and *MCR* business models. First, the defining factor in the *TaaS* category entries is that they focus on offering uniform-based workwear and, in the case of one of the entries, also other textiles that are used in a professional setting, such as towels and linen for the hospitability business, based on business-to-business contracts with the employers. The *MCR* companies, on the other hand, offer their services to private customers. It is worth noticing, however, that as there are currently only two entries in this category, the distinction between offering the services to private persons versus companies may be one that is likely change in the future, as the *TaaS* business models may get more common.

Second, the *TaaS* business models operate according to these contracts automatically, and always include rotation planning, washing, cleaning and other maintenance services, whereas the *MCR* business models leave at least some of the responsibility of choosing the pieces the customers want to wear for each time period on the customer, and do not always automatically include solutions for the Use Phase element. *TaaS* business models also take care of the logistics of the products entirely, while the *MCR* business models always require at least some input from the customers.

Third, the *TaaS* business models aim to cover all textile needs of the chosen category of their customers while the contract is in place, whereas the *MCR* business models tend to only offer a limited number of items per renting period, hence expecting the customers to supplement their sartorial needs by other solutions than the items they have from the *MCR* company at any given moment. In other words, an *MCR* is a supplement to the customer's existing wardrobe, but a *TaaS* aims to cover all relevant needs completely.

Despite the fact that both entries in this category seem to be responsible for the production of the textiles they offer, neither of the business models in this category addresses the Production building block in any way. As the companies of the category partly market themselves based on the ecological benefits of their services, this seems contradictory. Only one of the entries addresses the Materials element, by manufacturing more than 80 % of their products from recycled fabric and fibers. Both entries address the End-of-Life building block by recycling their products as fiber of fabric or other raw material, sometimes in collaboration with either *B2B-RMR* companies or companies in the *Recycled Fabrics* or *Recycled Fibers* categories. The Distribution building block was only addressed by one of the companies, by claiming to use efficient logistics when possible.

The Use Phase is a particularly interesting building block in this category, as one of the main factors in the offering of these business models is taking full responsibility of the washing, cleaning and maintenance functions of their products. Both of the companies address this attribute by consumer education, but only one of them claims to address this in any other way, by mentioning repairs, safe professional laundering services and longevity of their products.

The key contribution to sustainability of the *TaaS* category hence seems to depend on the environmental benefits gained or impacts avoided by the Functional Value building block, combined with the End-of-Life solutions the companies have to offer. As there is no research conducted on the sustainability factors of *as a service* function compared to owning the garments, this category seems to have one more thing in common with the *MCR* category; the overall sustainability performance of the category may be questionable until further research has been conducted on the subject.

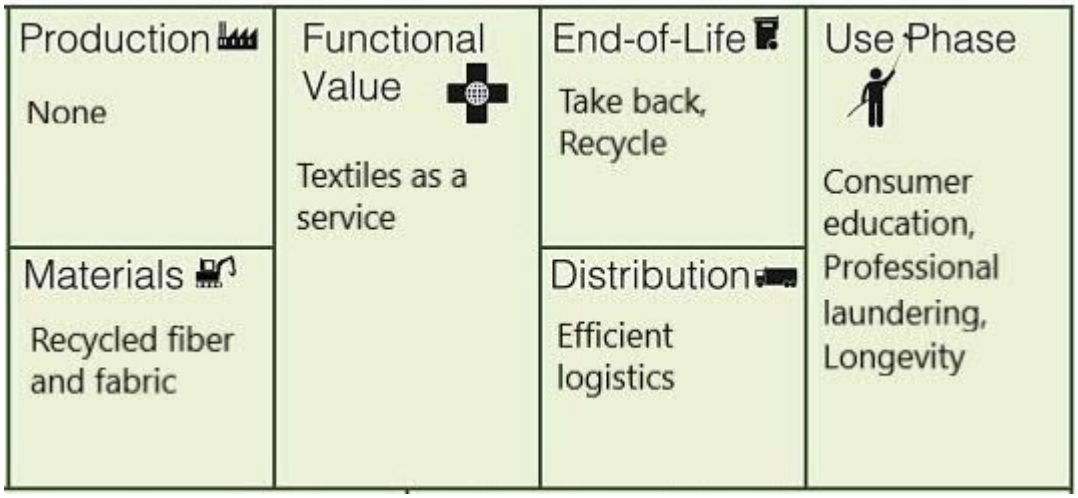

Figure 14. Most commonly addressed sustainability elements in the Textiles as a Service category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.7.Marketplaces

Marketplaces concentrate in selling new products – as opposed to second hand markets – that can be classified as sustainable apparel from several different brands in one marketplace. The form of business can be a webshop or a physical store, or a combination of these forms. Most entries in this category stated a will to make finding and buying sustainable fashion easier as the driving force behind founding the business model, and this is also their main contribution to the overall sustainability of the textile domain.

The *Marketplaces* differ clearly from the other categories in this typology in the fact that the claims they make for addressing the different sustainability attributes are typically simultaneously highly comprehensive and quite scarce. As the marketplaces typically do not design, produce, commission or own the products they sell, they can only report on sustainability attributes that are either welcomed, encouraged, or expected of the brands they represent. This leads to a situation where for the purposes of gathering the data, the sustainability claims of the *Marketplace* would either encompass all sustainability attributes that even one of the brands sold at the marketplace addresses, or only include the bare essentials that are absolutely required from every brand accepted by the *Marketplace*.

The *Marketplaces* typically publish in detail their selection process aimed towards the brands wishing to join the *Marketplace.* This is most likely done both in order to serve the brands as much as to convince the customers of the rigorousness of the selection process in order to emphasize the trustworthiness of the *Marketplace* and its values. The typical selection process tends to include a list of sustainability attributes that the brands are expected or welcomed to address, but the number and type of attributes that lead to a brand to be accepted seems to be up for evaluation on a case-by-case basis. This means that the *Marketplaces* typically do not have an immutable set of sustainability attributes that could be interpreted as the bare essentials for approval, as the sustainability performance of the brands is evaluated individually.

For this reason, I have accepted all sustainability claims of the *Marketplaces* to be included in the data. However, in this category it is advisable to treat the sustainability claims with great caution, as many attributes listed in the data may only be addressed by a small proportion of the entire offering of the *Marketplace*.

All *Marketplaces* in the data tend to address the building blocks Materials, Use Phase and Production in several ways. Recycled and certified materials are often cited, as well as animal welfare in raw material production where animal products are offered. The solutions in the Use Phase building block tend to include mainly longevity and consumer education. Production elements tend to be limited to certifications, local production, reduced chemical use, and transparency.

Most entries in this category do not address the End-of-Life building block in any way. When this attribute is addressed, it typically does not include all of the products offered by the marketplace, but only some products in the form of a take back that leads to recycling.

The Distribution building block is typically the only one the business models in this category may be directly responsible for themselves. This is also the only category in this typology where every entry has addressed this element, though this may be the result of accepting any and all sustainability claims of the *Marketplaces* into the data, even when they only apply to a small percentage of their offering. Typically efficient or sustainable transportation is encouraged, and packaging is expected to be either recycled or reusable,

or sustainably made in some other way. As some of the logistics and packaging may be executed before the products arrive at the marketplaces, or in some business models of this category may be conducted entirely outside of the *Marketplace*, the Distribution building block is not entirely in their power, and may therefore also include factors that are not always actualized.

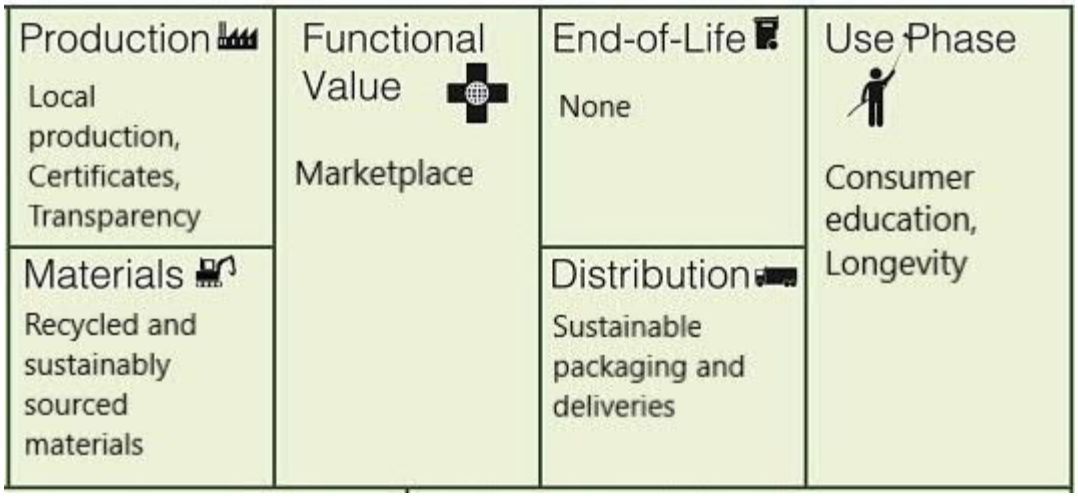

Figure 15. Most commonly addressed sustainability elements in the Marketplaces category. Modified from the original TLBMC chart (Joyce & Paquin, 2016).

4.8.Pieces of the Same Puzzle

I have discussed above the individual typical traits of each archetype of modern sustainable business models in the textile industry. An interesting finding in the data at large is that none of the entries in the data can be defined as circular in and of themselves, but together, by complementing each other, the archetypes can form an ecosystem of business models that can, as a whole, be seen as circular. The criteria for a business model to be accepted into the data in this study did not require the entries to adhere to the principles of circularity specifically, so it would seem that doing business in a sustainable way may rotate towards a circular ecosystem naturally.

In this ecosystem, the *B2B-RMR* business models close the material loops by providing both raw materials for new products as well as an end-of-life solution for many discarded items. The sub-categories of *Sell products* businesses produce new items to be then sold by their own channels or through *Marketplaces*. Once the items are already in circulation, both *Services* as well as *MSH* business models help to lengthen the life cycle of the products as far as possible, by keeping them in good condition as well as recycling them from one user to another. The *TaaS* business models provide workwear and all related maintenance and logistics in the most sustainable way. At the end of their useful life cycle, the garments can be recycled through the *B2B-RMR* or *Recycled Fabrics* business models. The main focus of the entire ecosystem is to minimize the environmental impacts and resource use of the production of any new items and to slow down the life cycles of the products by emphasizing mindful consuming, ensuring the quality of the production, and promoting repairs, reuse, and recycling.

The definition for a circular business model used in this study was presented in chapter 2.3 as a business model that has addressed all aspects of the definition for circular economy used in this study: “Circular economy in the textile domain should entail closing the material loops, lengthening the life cycles of products as much as possible, and minimizing the input of new materials and energy by both concentrating on producing quality over quantity as well as optimizing the use of all resources.” This ecosystem as a whole corresponds to this definition of a circular business model used in this study.

However, no single business model in the data addressed all aspects of the definition alone. For example, no one business model in the data was capable of closing the material loops on their own, but they did form mutually beneficial collaborations that were capable of achieving closed loops. The business models that focused on closing the material loops did not, however, typically address the longevity of the products in any way. Lengthening the life cycles of products, on the other hand, may be the result of input from several business models, from the production phase focused on longevity and quality, to repair, cleaning and maintenance services during the use phase, and possibly several rounds of second handing before the product reaches the ed of their useful life. However, the business

models focused on the longevity of products often did not address the End-of-Life building block or closing the material loops in any way. The business models of the *Superstar* category come close to the circular definition, but they, too, execute some of the aspects demanded for circularity in collaborations with other companies.

Even though no one entry in the data can be defined as circular on their own, all entries either did or could have participated in the circular economy as a part of the ecosystem. This can be seen as encouraging for the concept of a circular business model; a business model that performs their own part in the circular chain well can be a part of the solution to the problems of the domain even without needing to address all problems themselves. In circular economy, business models should therefore perhaps be seen and researched more as specialized pieces of the same puzzle rather than independent actors that also need to address all of the problems independently as well.

This notion of a circular ecosystem formed from several business models is a wider angle on circular and sustainable business models than the typical focus in the literature has been. The idea of an industrial ecosystem in not new, but has previously been discussed in relation to the circular economy only in passing, or on the level of theory (Lüdeke-Freund, Gold, & Bocken, 2019; Henry, Bauwens, Hekkert, & Kirchherr, 2020; Kant Hvass, 2018; Fontell & Heikkilä, 2017). The previous research in circular economy on wide empirical data has been concentrated on the circular economy as a concept (Murray, Skene, & Haynes, 2017; Koszewska, 2018; Nußholz, 2017), or circular business models on the level of individual business models (Manninen et al., 2018; Urbinati, Chiaroni, & Chiesa, 2017; Henry et al., 2020), but research on empirical data of this emerging circular ecosystem of several different types of business models seems to be still lacking.

It is also worth noticing that the business models of the typology were able to overcome the hindrances the fragmentary nature of the textile domain is claimed to pose (Fletcher, 2013). The ecosystem was clearly not deliberately built or designed, but rather spontaneously born out of independent, sustainably-oriented business activity, so its existence proves that it is possible to transform the practices of the industry without superimposed regulation such as legislation or international agreements.

As the dataset proves, the sustainability transformation of the textile domain has already begun, and new, more sustainable business models are already in existence in large numbers. Though the domain is still largely problematic, even small players can have transformative influence in changing the markets. The sustainability-oriented market transformations can take place either by scaling up the small sustainable business models or by sustainability-oriented upgrading and innovation of conventional mass market players (Boons & Lüdeke-Freund, 2013; Schaltegger, Lüdeke-Freund, & Hansen, 2016; Geels, 2002; Markard, Raven, & Truffer, 2012; Stubbs & Cocklin, 2008; Koszewska, 2018).

As the archetypes form an ecosystem and support each other's functions, the ecosystem as a whole can have more of an impact on transforming the domain than any of the businesses individually. As Schaltegger et al. (2016) discuss, even small players can have transformational power to initiate change on the system level. But as the circular ecosystem is already emerging, the system level change is already in motion, and can be expected to gain more momentum as they challenge the traditional, linear production operators in the field. The data shows both successful sustainability-oriented upgrades of larger players in the field, mainly in the *Superstar* category, as well as smaller players upscaling their operations.

A regularly cited hindrance in forming circular economies is the lack of functioning reverse logistics (Ellen MacArthur Foundation, 2017). This problem was present in this dataset as well. A possible solution for this problem could be found by taking a cue from the MSH business models, by emulating the key pattern of emphasizing the value of the items and materials in circulation. This could provide the incentive to establish the reverse logistics paths in the ecosystem. Especially if the pricing of virgin materials would bear the environmental and social costs of the production, it could also drive up the value of non-virgin materials by comparison, providing a stronger financial benefit for reclaiming the materials already in circulation. The idea of technology to track products and materials (Fernie et al., 2010; Kant Hvass, 2018) could similarly both increase and benefit from the perceived value of raw materials already in use.

4.9.One of the Pieces May Not Fit the Picture

It is worth noting that one of the archetypes presented in this typology raises perhaps more questions than they seem to answer. The contribution to the overall sustainability of the textile domain of *Modern Clothing Rentals* business models hinges on the assumption that the main operational model of collaborative consumption is more sustainable than traditional ownership of products. It is worth noticing, then, that little research has been conducted on the actual sustainability impacts of *MCR* business models. Some research has been conducted on the consumers of these business models (Gwozdz, Steensen Nielsen, & Müller, 2017; Armstrong, Niinimäki, Kujala, Karell, & Lang, 2015), but research on the business models themselves and their actual sustainability performance seems to be entirely lacking.

As a result, several questions remain unanswered, such as what is the capacity utilization rate of the *MCRs*; do these business models only move the problem of unused clothing sitting in the wardrobes of consumers out of sight and into the warehouses of the *MCR*s? What is the ecological impact of the constant transportation of the items between the company and the customers; for example, as there are concerns around the hyperactive order-and-return cycle of webshops in the *Sell Products* category (Kang, Liu, & Kim, 2013), it is questionable whether there is a substantial difference in the quantities of back-and-forth transport of the last mile in rental services by comparison.

There is no research on whether *MCR* services actually have an impact on the shopping habits of their customers; since the ecological benefits are mainly dependent on the customers choosing to rent instead of buying, it is imperative that renting therefore should lower the number of items bought for any benefits to actualize. If rentals only add to the consumption of clothing on top of the garments the renters buy, the *MCR* business models may even have a harmful effect on the overall sustainability of the industry by accelerating the pace of changes in fashion. This may be done by lowering the prices per wear compared to buying items that only get worn a few times, and by making it more socially acceptable and diminishing the moral questionability of an individual consumer changing the contents of their wardrobe on a fast-paced rotation.

Since the business models in this category also rarely address any other sustainability attributes but the Functional Value, it is also questionable whether the business model merely shifts the moral responsibility of unsustainably produced textiles away from the consumer without offering an actual solution to the problematic production itself.

When evaluating the overall potential of the ecosystem formed by the archetypes of this typology to address the sustainability problems of the textile domain, it is also worth noticing that the current trend in *MCR* business models' marketing clearly differs from the general marketing tendencies of all the other categories in one aspect. It is typical for the other categories to engage in consumer education in their marketing by addressing the speed of fashion and the consumer's need for frequent change in their apparel as a primary source for the unsustainable practices in the fashion industry, and stressing that this constant need for change and variety urgently needs to stop. The *MCR* business models do the exact opposite in their marketing, strongly promoting and encouraging frequent change in the apparel choices of their customers.

A typical marketing line by an MCR may even use the speed of fashion as a marketing vehicle, as seen in a quote by Chic by Choice: "Another event? You don't have to wear the same dress twice... Chic by Choice means you can always wear something new! Because you feel your best when you're wearing something for the first time, our designer dresses look awesome on everyone and they're for rent. It's a win-win." (Chic by Choice, 2019) This kind of marketing perpetuates the thinking that one should only wear a particular piece of clothing, such as ball gowns or cocktail dresses, to special occasions only once, and maybe even change the wardrobe worn on a daily basis quite often as well.

Within the paradigm of fast changing fashion, it is naturally a more sustainable choice to rent the garments rather than to buy, to get the most use out of a single item before it is discarded. But this basic premise of thought toward fashion and textiles that the MCRs promote perpetuates the main problem of the culture of over-consumption. Since the sustainable future of the textile industry necessitates leaving behind the culture that encourages, expects and celebrates ever-changing wardrobe choices (Fletcher, 2013;

Niinimäki, 2013; Ellen MacArthur Foundation, 2017), the point of rental services outside of one-time special occasion wear such as wedding dresses is questionable.

As the main contribution of the *MCR*s to the overall sustainability of the textile domain remains unclear, but it is clear that they are promoting harmful consumption patterns in their marketing and may base some of their operations on these unsustainable patterns in fashion consumption, it seems they may not possess the potential to prove transformational for the domain. The subject urgently requires more research, but with the knowledge available at the time of this study, granting the MCRs a place in the future sustainable ecosystem of the textile domain seems uncertain.

5. Conclusions

The main research question of this study was “What kinds of sustainability-oriented business models can be found in the textile domain?”. I aimed to answer this question by creating a framework to define a sustainable business model in the textile domain, and then analyzing already existing business models online. Based on the framework, a typology was created of the business models in the data using the Triple Layered Business Model Canvas (Joyce & Paquin, 2016) as a base reference to differentiate between separate sustainability functions.

5.1. Summary of Findings

This study identified seven main archetypes of modern sustainable business models in the textile domain. Each archetype has its own distinct operational model and typical ways of addressing different sustainability attributes. Despite the unique features of each category, the archetypes share some common qualities, such as aiming to lengthen the useful life cycles of products and minimizing resource use and emissions in the production and use phases.

The seven main archetypes are:

- *Business-to-Business Raw Material Recyclers (B2B-RMR)* business models produce recycled fibers from post-consumer or post-industrial waste, such as discarded plastic bottles or cutting scraps of the textile industry. They typically function in collaborations with other companies, either by providing recycled fibers of by licensing technology to the collaborating partners.
- *Modern Second Hand (MSH)* business models recycle garments as they are from owner to owner.
- *Sell Products* business models are responsible for the production choices of the products they sell. This category has been further divided into four sub-categories:

    - *Recycled Fibers* business models are defined by their use of recycled fibers as their main choice of raw material.
    - *Recycled* Fabrics business models are defined by their use of recycled raw materials without breaking them down to the fiber level.
    - *Slow Fashion* business models emphasize consumer education for mindful consuming and longevity of their products as their main selling points. Their investing in any other sustainability factors is typically presented as choices made in order to produce better quality in products.
    - *Sustainability Superstars* business models typically display extensive and versatile investing in sustainability in all of their functions, with ongoing improvement plans for the future as well. The sustainability factors are presented in their marketing as valuable in and of themselves, not merely as vessels for better quality in products.
- *Services* business models aim to lengthen the life cycles of garments that are already in circulation by repairs, remodeling, cleaning, or other maintenance.
- *Modern Clothing Rentals (MCR)* business models aim to increase the use rates of garments by increasing the number of consumers who use them.
- *Textiles as a Service (TaaS)* business models take care of the customer's particular textile needs entirely, including rotation planning, cleaning, maintenance and logistics, based on a business-to-business contract.
- M*arketplaces* business models typically state that their main aim and contribution to sustainability is to facilitate the link between consumers and sustainable textile producers.

None of the archetypes can be described as circular business models in and of themselves, but together, by each performing one task in the circular chain, the categories form an ecosystem of sustainable business models in the textile domain than can, as a whole, be defined as circular.

5.2.Theoretical Contribution

The main theoretical contribution of this study is the typology created of the empirical data. It provides information on what types of sustainability-oriented modern business models can be found in the textile domain. This study provides a baseline typology for the domain that can help in future research by offering a structured view on the different business models in the field.

This study also provides a platform for examining the business models, by creating a theoretical framework for making comparisons on the different sustainability aspects, and delivering a description on the typical sustainability performance of each archetype and their ability to contribute to the sustainability of the domain as a whole.

A notable theoretical contribution is also the notion that none of the entries in the data can be described as circular in and of themselves, but together the archetypes can form a circular ecosystem, each performing one task in the circular chain. When examined from this perspective, the categories seem to fit together and support each other almost seamlessly. Though the textile industry is fragmentary, the examples of the typology show that the problems of the industry can be tackled even within this fragmentary framework, as long as every part of the chain functions sustainably. Especially the agents that work with upcycling and minimizing waste, such as the *Recycled Fabrics* sub-category, help clean up the entire process of textile production by taking care of the small, accumulating side streams of potential waste and upcycling them.

The problem of inadequate reverse logistics, often cited in research on sustainable business in textiles, is not solved in the ecosystem the categories of this typology forms. However, one element in one of the archetypes may offer an insight for accelerating the formation of such logistics. The emphasis placed on the value of the second hand items by the *Modern Second Hand* business models could possess the power to transform the attitude of the whole industry towards the perceived value of the items produced. Especially if this new thinking paradigm could be coupled with virgin materials bearing the ecological and social costs in their price tags, the reverse logistics could be an attractive business model in itself.

The sustainability performance of *Modern Clothing Rental* business models is unclear, as the topic seems to be under-researched. The *MCR*s also typically engage in problematic marketing, by strongly promoting and encouraging frequent change in the wardrobes of their customers. As the fast pace of fashion has been flagged as one of the main root problems in the industry, it is questionable whether the business model archetype can, in fact, be viewed as sustainable. This topic requires more research before any conclusive decision can be made.

5.3.Managerial Implications

From a managerial perspective an interesting detail in the findings of this study is the fact that there seems to be a clear positive correlation between the financial performance and size of the businesses examined, and the number of sustainability attributes they claim to address as seen in the *Sustainability Superstars* category. Within the scope of this thesis it was not possible to study this correlation more closely, so it is impossible to reliably determine whether there is also causality between these factors, but this should be seen as an encouraging development. At the very least this phenomenon proves that creating shared value can be a profitable business plan from the financial as well as the environmental and social perspectives, and aiming for superstardom seems to be advisable for any business model in the textile domain, if the business is seeking substantial, sustainable growth or financial success.

Based on the publicly available information on the companies' web pages, it was difficult to infer how the end-of-life and distribution solutions were addressed by the business models in the data, with the exception of the *Superstar* category. From a managerial perspective, especially these factors should be taken into consideration more frequently, as aspiring to be a Superstar would entail addressing all sustainability aspects equally.

As the archetypes form an ecosystem, it would be advisable for a manager in this field to consider the position of their company in relation to this ecosystem. The different business models perform separate steps in the circular chain, but can also enjoy synergies even

without superimposed regulations such as legislation, by finding their place in the ecosystem and benefiting from for example other companies' waste.

5.4.Suggestions for Future Research

A clear path for future research would be to examine the link between economic success of a company and its sustainability performance. This study shows that there seems to be a clear correlation between the factors, but more research is needed on the potential causality.

An another field for further research identified in this study is the circular ecosystem of business models on the level of ecosystem as a whole. As this study shows, these circular ecosystems are already forming in the textile domain, but it seems the empirical research this far has centered on the level of business model. Extending the focus from single business models towards this ecosystem thinking would produce an enhanced understanding of circular economy and how it could be implemented on the industry level, as the ecosystem thinking places less pressure on the sustainability performance of individual business models, while it can simultaneously be more powerful in trasforming the industry as a whole. To achieve this, researchers need to start looking at sustainability and circularity in empirical data as a web of interconnected and interdependent business models.

An avenue for future research also identified in this study is the sustainability performance of *Modern Clothing Rental* business model. The sustainability of their operations largely depend on the sustainability impacts of the business model's key offering, but it is unclear whether they truly do deliver the benefits often associated with them. It is also unclear whether they fit into the circular ecosystem the other archetypes form, as their demand mainly stems from the unsustainable demand for constant change in the wardrobe choices in the current culture. More research is needed to clarify the actual sustainability benefits and impacts of the business model to evaluate its transformational potential for the domain.

A more comprehensible research of the domain could also be called for, as some business models may have been excluded from this study simply due to language barriers. Especially Asia seems to have innovative, modern business models in this field, but due to language barriers they were left out of this study.

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Appendices

Appendix 1. Table of business models in the empirical data

Category	Company	Functional value
Business-to-Business Raw Material Recyclers	Waste2Wear	B2B collaborations; provides raw materials and finished products
Business-to-Business Raw Material Recyclers	The Infinited Fiber Company	B2B Licensing technology
Business-to-Business Raw Material Recyclers	Evrnu	Licencing technology, B2B collaborations
Business-to-Business Raw Material Recyclers	Re:Newcell	B2B collaborations; produces raw material
Marketplace	Nudge	Marketplace, shop for sustainable fashion
Marketplace	Ivalo	Marketplace, Webshop for sustainable fashion
Marketplace	Weecos	Marketplace, Webshop for sustainable fashion
Marketplace	Ethical Time	Marketplace, Webshop for sustainable fashion
Marketplace	EcoFashionLabels	Marketplace, Webshop for sustainable fashion

Modern Clothing Rentals	Vaatepuu	Renting clothes
Modern Clothing Rentals	Vaaterekki	Renting clothes
Modern Clothing Rentals	Chic by Choice	Renting clothes
Modern Clothing Rentals	Le Closet	Renting clothes
Modern Clothing Rentals	Rent the runway	Renting clothes
Modern Clothing Rentals	Tulerie	Renting clothes, peer-to-peer
Modern Clothing Rentals	Nuuly	Renting clothes
Modern Clothing Rentals	Mud Jeans	Renting clothes, sell products
Second Hand	Zadaa	Secondhand marketplace, peer-to-peer, app
Second Hand	Emmy	Secondhand marketplace, peer-to-peer, webshop
Second Hand	Vestiaire	Secondhand marketplace, peer-to-peer, webshop
Second Hand	Relove	Secondhand marketplace, physical

Second Hand	Recci	Secondhand marketplace, physical
Second Hand	The Realreal	Secondhand marketplace, physical and webshop
Second Hand	Rekki	Secondhand marketplace, webshop
Second Hand	ReTuna	Secondhand marketplace, physical mall
Second Hand	Depop	Secondhand marketplace, peer-to-peer, app
Sell Products / Recycled Fiber	Pure Waste	Sell products, B2B raw material producer
Sell Products / Recycled Fiber	HallaHalla	Sell products
Sell Products / Recycled Fiber	Rens	Sell products
Sell Products / Recycled Fiber	The other Danish Guy	Sell products
Sell Products / Recycled Fabrics	Lovia	Sell products
Sell Products / Recycled Fabrics	Globe Hope	Sell products
Sell Products / Recycled Fabrics	Costo	Sell products

Sell Products / Recycled Fabrics	Jouten	Sell products
Sell Products / Recycled Fabrics	Nukak	Sell products
Sell Products / Sustainability Superstars	Reformation	Sell products
Sell Products / Sustainability Superstars	Patagonia	Sell products
Sell Products / Sustainability Superstars	Stella McCartney	Sell products
Sell Products / Sustainability Superstars	Tauko	Sell products
Sell Products / Sustainability Superstars	Veja	Sell products
Sell Products / Sustainability Superstars	Nudie Jeans	Sell products

Sell Products / Sustainability Superstars	Nosh	Sell products
Sell Products / Slow Fashion	Asket	Sell products
Sell Products / Slow Fashion	Oikiat	Sell products
Sell Products / Slow Fashion	Nomen Nescio	Sell products
Services	Remake Ekodesign	Services, sewing services, renting clothes
Services	Clothes Doctor	Services, sewing, repairs, cleaning, sell cleaning and care products
Services	Tilli	Services, sewing services, repairs
Services	Arkive Atelier	Services, maintenance services, repair services, cleaning, instructions and products for home maintenance
Textiles as a Service	Lindström	Textiles as a service, business use only
Textiles as a Service	Touchpoint	Workwear as a service, sell products

Appendix 2. Table of the most commoly cited elements by archetype

Archetype	Materials	End-of-Life	Distribution	Use Phase	Production
Business-to-Business Raw Material Recyclers	Creates recycled fibers from waste	Recycle as fiber	None	None	Chemical and energy use addressed
Modern Second Hand	None	None	None	None	None
Sell Products / Recycled Fibers	Recycled fibers	None	None	Consumer education	Transparency
Sell Products / Recycled Fabrics	Recycled fabrics, sustainably sourced virgin materials	None	None	None	Transparency, Hand made, Local production
Sell Products / Slow Fashion	Animal welfare, Chemical use checked	None	Reusable or biodegradable packaging	Consumer education, Longevity	Energy, water and chemical use checked, Transparency

Sell Products / Sustainability Superstars	Recycled materials, sustainably sourced virgin materials	Recycling as product, fabric or fiber	Reduced, recycled and recyclable packaging	Longevity, Consumer education, Repairs offered or encouraged	Transparency, Energy and chemical use checked
Modern Clothing Rentals	None	Second hand	Reusable packaging	Chemical use in cleaning checked, Repairs	None
Textiles as a Service	Recycled fiber and fabric	Take back, Recycle	Efficient logistics	Consumer education, Professional laundering, Longevity	None
Marketplaces	Recycled and sustainably sourced materials	None	Sustainable packaging and deliveries	Consumer education, Longevity	Local production, Certificates, Transparency